



The **VALUE CLIMB**

Healthcare-Biotech GCCs Beyond IT Support to Double-Digit Share



Executive Summary

India's Global Capability Centers (GCCs) have crossed **USD 98.5 billion in revenue as of FY2026**, a **32% expansion since FY2021**, with **2,100+ active centers employing 2.4 million professionals**. Within this ecosystem, healthcare and life sciences represent the most consequential sector transition: **from process-delivery units to institutions** that now hold **operational ownership over drug discovery pipelines, global regulatory submissions, and AI-enabled clinical infrastructure**.

The composition of work inside healthcare and biotech GCCs has changed materially. Indian centers now handle 45% of global drug discovery and development workflows, 60% of global regulatory affairs submissions to the FDA, EMA, and WHO, and 54% of pharmacovigilance operations for multinational life sciences companies. These functions are located at the top of the clinical and commercial value chains, not adjacent to them.

Key Highlights:

- The reclassification of GCC work from **support-tier to mission-critical** is now visible in workforce data: **roughly 300,000 professionals across 150+ healthcare and life sciences GCCs** hold titles in clinical research, bioinformatics, regulatory science, data analytics, and digital health infrastructure.
- By 2026, **eight of the thirteen largest pharmaceutical companies representing 55% of global market value could see 30% or more of their revenue** jeopardized, with individual exposure ranging from USD 6 billion to USD 38 billion.
- **Drug development costs have reached USD 2.6 billion per asset, with timelines approaching 100 months.**
- Since 2019, adoption of **AI and machine learning in healthcare GCCs has increased from 65% to 86%**. India has over 1,200 GCCs with embedded AI capabilities, supported by 250+ dedicated centers of excellence and approximately 250,000 AI professionals, making it home to one of the world's largest concentrations of enterprise AI talent.
- In drug discovery, AI-assisted molecular screening and computational chemistry have compressed R&D cycle times by 30–40%.
- The **global AI drug discovery market is projected to grow from USD 1.5 billion (2024) to USD 13 billion by 2032**, with India-based Global Capability Centers serving as a primary talent engine driving this execution.
- **India's bioeconomy has expanded nearly 20-fold in a decade to USD 195.3 billion, growing at 18% annually.** Backed by the BioE3 policy and a USD 12 billion Research, Development, and Innovation Fund, the government targets USD 300 billion by 2030, with healthcare GCCs serving as the core operating layer driving this growth.

Driven by Western talent shortages, tighter R&D budgets, and decentralized trials, high-complexity mandates are increasingly routing to India, giving healthcare GCCs the highest value-per-head trajectory in the ecosystem. This report examines the shift, which is underscored by the AI drug discovery market, which heavily relies on Indian GCCs as its primary global engine for talent and operational execution.



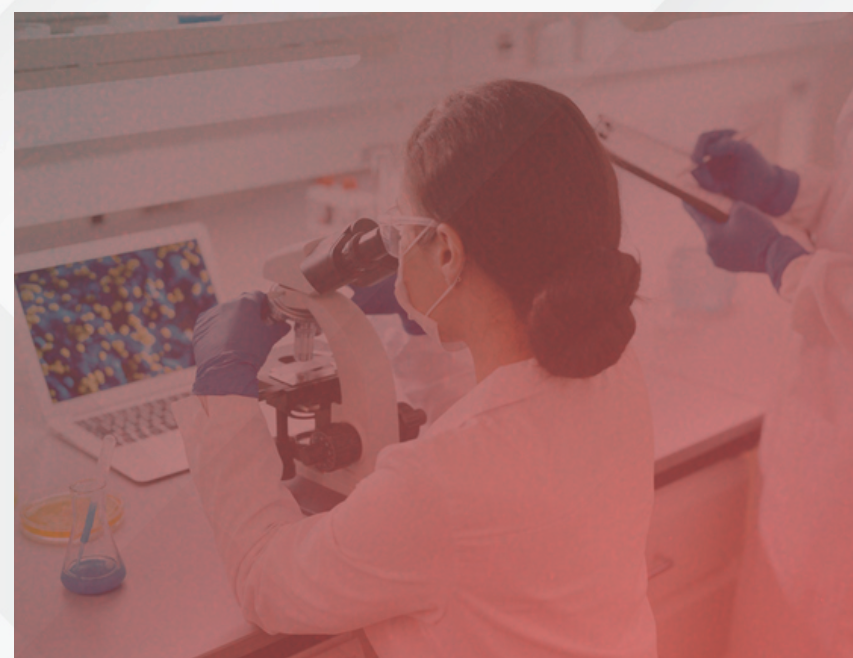


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The Structural Case: Why Healthcare GCCs Are Expanding

Three quantifiable pressures are reshaping where complex clinical and regulatory work is executed: a **concentrated wave of pharmaceutical patent expirations between 2025 and 2030**, an **uninterrupted rise in per-asset development costs**, and a **structural talent deficit in the United States and Europe** that workforce pipelines cannot resolve within the relevant timeframe. India-based healthcare Global Capability Centres provide the operational responses to all three.

The 2025–2030 Patent Cliff and Revenue Exposure

The global pharmaceutical industry is facing an unprecedented systemic risk: a **historic Loss of Exclusivity (LOE) cycle**. Between 2025 and 2030, an **estimated USD 236–300 billion** in branded pharmaceutical revenues will be **exposed to generic and biosimilar competition**. This cliff represents a threefold increase in scale compared to the 2016 LOE wave, threatening the margin profiles of the world's largest life sciences firms.

The commercial impact of this LOE cycle is structurally distinct from historical precedents due to a high concentration of complex biologics. The erosion velocity varies sharply by modality:

- **Small Molecules (e.g., Eliquis):** Characterized by immediate, catastrophic revenue compression. Automated pharmacy-level substitution typically drives an 80–90% revenue decline within Year 1.
- **Biologics (e.g., Keytruda):** Characterized by a slower, multi-year decay curve. Due to specialized manufacturing requirements and the need for physician-targeted marketing, biosimilar penetration yields a 30–70% revenue decline in Year 1, creating a sustained tail risk.



Core Mega-Assets Facing Strategic Expiration

Asset (Originator)	Therapeutic Area	Annual Revenue Base	Key Expiry Window
Keytruda (Merck)	Oncology (Immunotherapy)	USD 29.5 Billion (2024)	2028
Eliquis (BMS / Pfizer)	Cardiovascular (Anticoagulant)	USD 13+ Billion (2024)	2027–2028
Opdivo (BMS)	Oncology	USD 9 Billion	2028–2030
Stelara (J&J)	Immunology	USD 10+ Billion	2025–2026
Darzalex (J&J)	Oncology (Multiple Myeloma)	USD 11 Billion	2029–2030

The financial exposure of this patent cliff is highly concentrated among market leaders, with **five of the top ten global pharmaceutical corporations facing a revenue-at-risk threshold exceeding 25% of their current baseline.**

To preserve operating margins and fund next-generation R&D pipelines under severe top-line compression, multinational drugmakers are aggressively optimizing SG&A and non-manufacturing costs.

The financial pressure is the primary economic catalyst driving the expansion of GCCs in India. By shifting high-overhead, knowledge-intensive functions such as **regulatory affairs, clinical data management, and pharmacovigilance** to these centralized captive hubs, pharma majors are **structurally reducing operational costs by 30–40%.**

Patent Cliff 2025–2030: Revenue at Risk by Company
(Bar label = USD bn at risk; percentage = share of total company revenue)

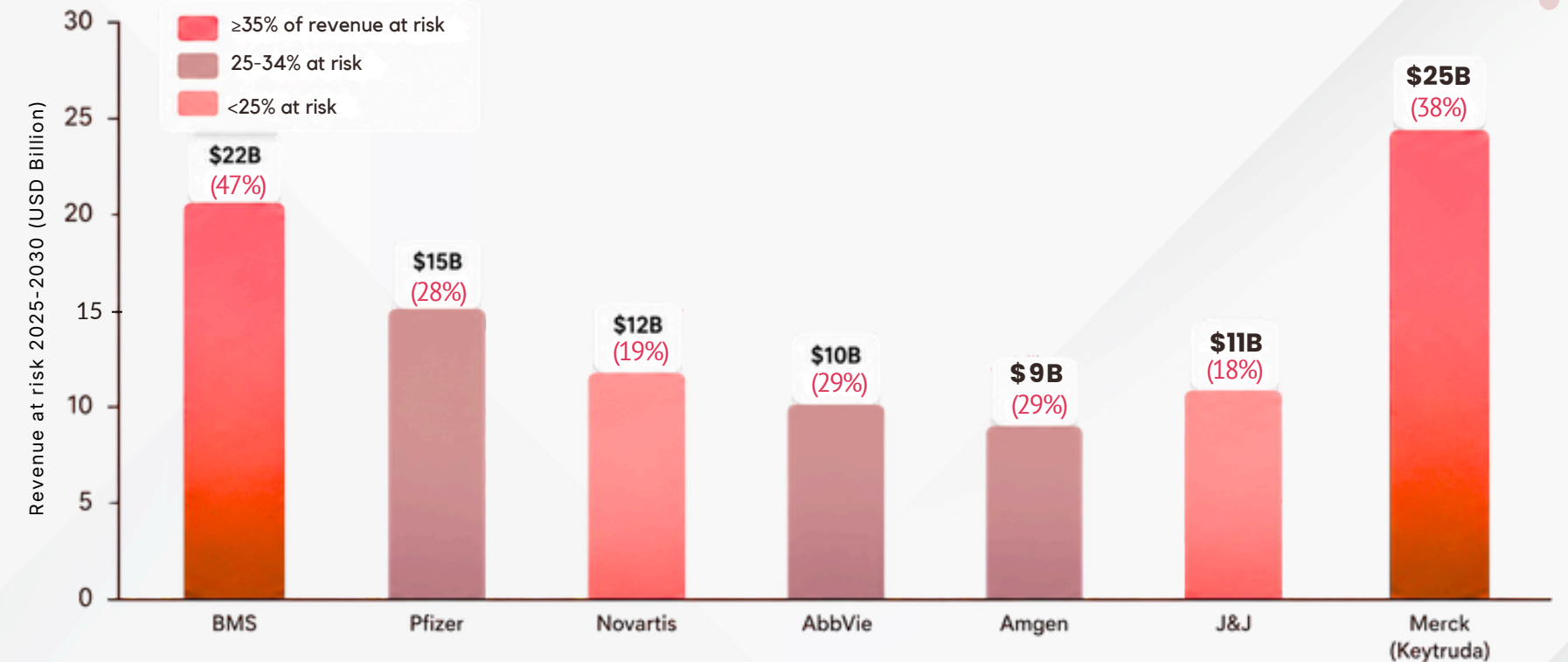


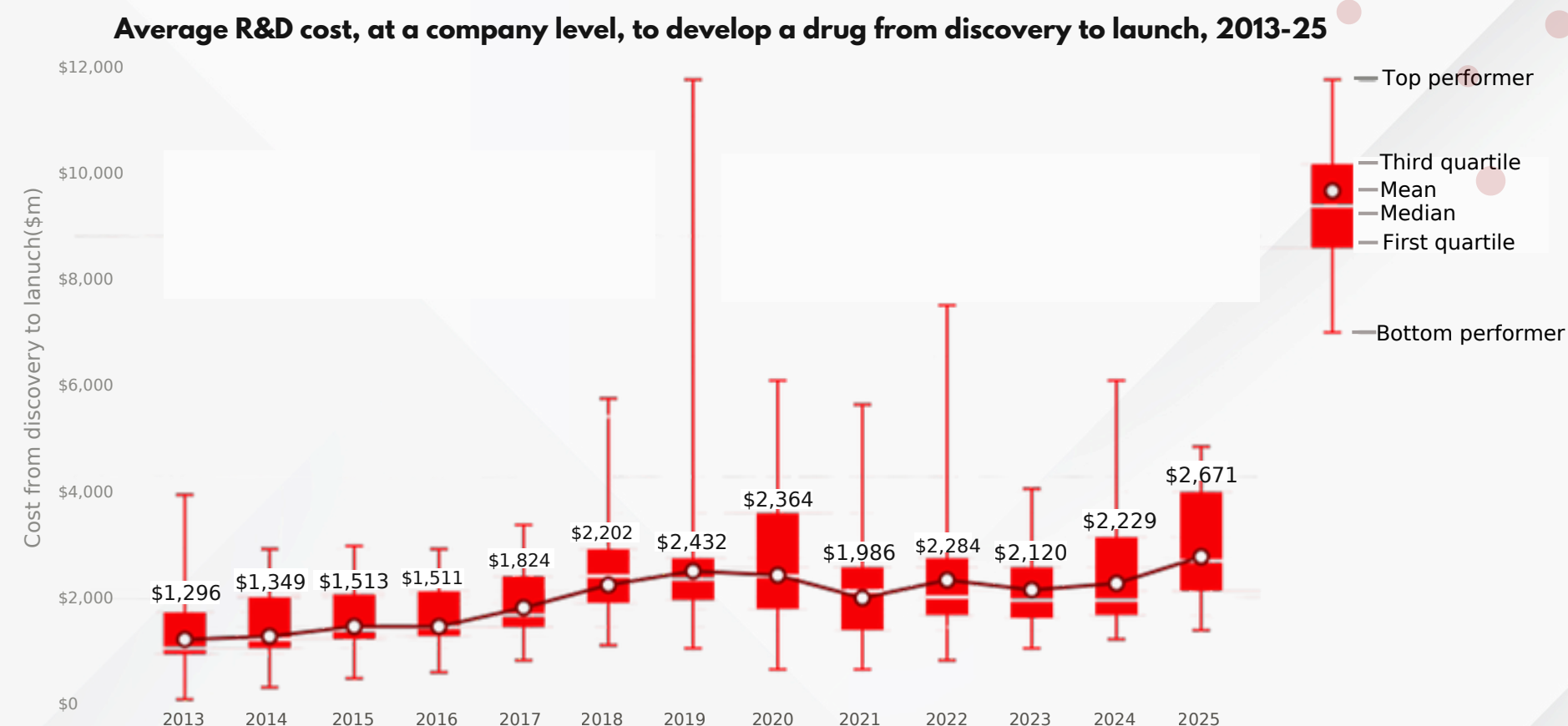
Figure 1.1: Patent Cliff 2025–2030 – Revenue at Risk by Company (USD Billion & % of Total Revenue) Source: ResearchAndMarkets (2025), DeepCeutix Strategic Briefings (2026), DrugPatentWatch (2025)

Key assets at risk: Keytruda (Merck, USD 29.5B, 2028); Eliquis (BMS/Pfizer, USD 13B, 2027–28); Opdivo (BMS, USD 9B); Ibrance (Pfizer, 2027); Stelara (J&J/AbbVie, 2025–26).



R&D Cost Inflation and Development Timeline Compression

- ▶ The average cost to develop a pharmaceutical asset from **discovery to market approval** reached a record **USD 2.67 billion** in 2025, up from **USD 2.23 billion** in 2024 and **USD 1.30 billion** in 2013.
- ▶ Driven by escalating clinical complexity, inflation, and high-value M&A deals, **17 of the 20 cohort companies analyzed experienced an absolute increase in their asset development costs** during this period. This rising cost base coincides with lengthening clinical timelines, underscored by Phase III clinical trial cycle times swelling by 12% in the preceding reporting cycle.
- ▶ The systemic challenge is further compounded by the stark cost of attrition, with billions of dollars in sunk R&D capital poured into late-stage assets that are subsequently terminated. With a structural Phase I-to-approval success rate historically hovering between **7% and 10%**, the **cost of commercial failure remains deeply embedded in every asset's budget**.
- ▶ No structural reduction in per-asset cost is projected in the near term: as absolute R&D expenditure rises across **17 of the 20 cohort companies**, the **late-stage pipeline has contracted by 4.6%**, severely compressing the denominator against a rising cost base.



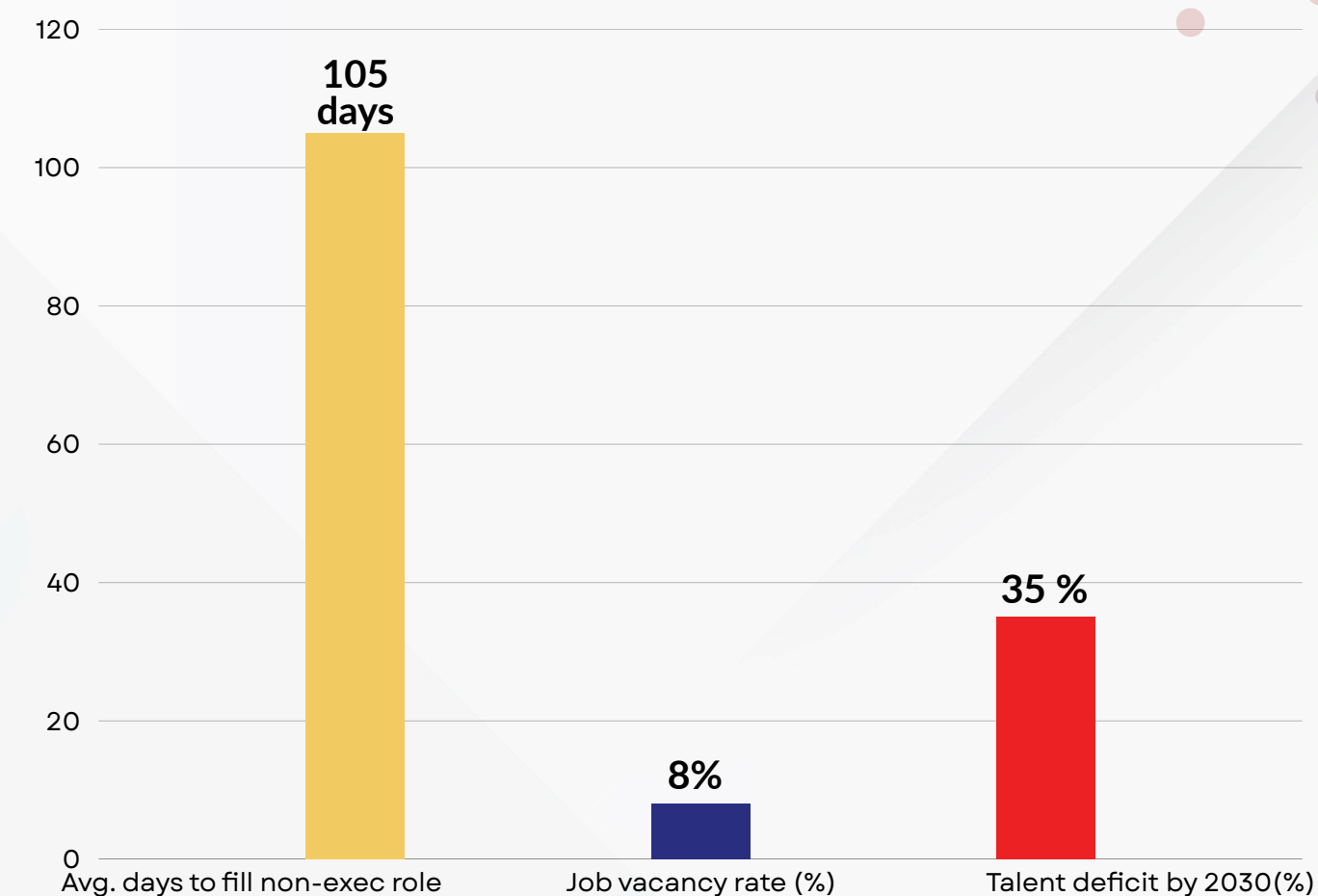
Source: Average R&D Cost per Asset, Big Pharma Cohort (2013–2025).
Source: Deloitte, Measuring the Return from Pharmaceutical Innovation, 2024 & 2025 editions



Talent Deficits in United States and Europe

- The pharmaceutical and life sciences sector faces a **35% talent deficit by 2030**, against a sector CAGR of 11.75% through 2028.
- In the United States, the Bureau of Labor Statistics projects workforce growth of 0.3% per year over the next decade against GDP growth of 1.9%. This structural mismatch worsens as demand for pharmaceutical products increases with an aging population.
- The US pharmaceutical job vacancy rate stands at approximately 8%, and non-executive roles take an average of 105 days to fill.
- Europe faces a parallel constraint: The European Commission's Directorate-General for Health and Food Safety has identified a shortfall of 1.2 million clinicians (doctors, nurses, and midwives), with the deficit widening as both the health workforce and the patient population age.
- Over 50% of European life sciences employers identify intermediate-level roles as the hardest to fill, precisely the profile required for regulatory submissions, pharmacovigilance signal detection, and clinical data management.
- India's annual output of life sciences and pharmacy graduates exceeds 600,000, with over 100,000 entering regulated GCC environments annually. The talent arithmetic is not comparable between the two geographies.

US Pharma/Life Sciences Talent Indicators 2025



Europe: Clinical Shortfall vs. Existing Workforce, 2025

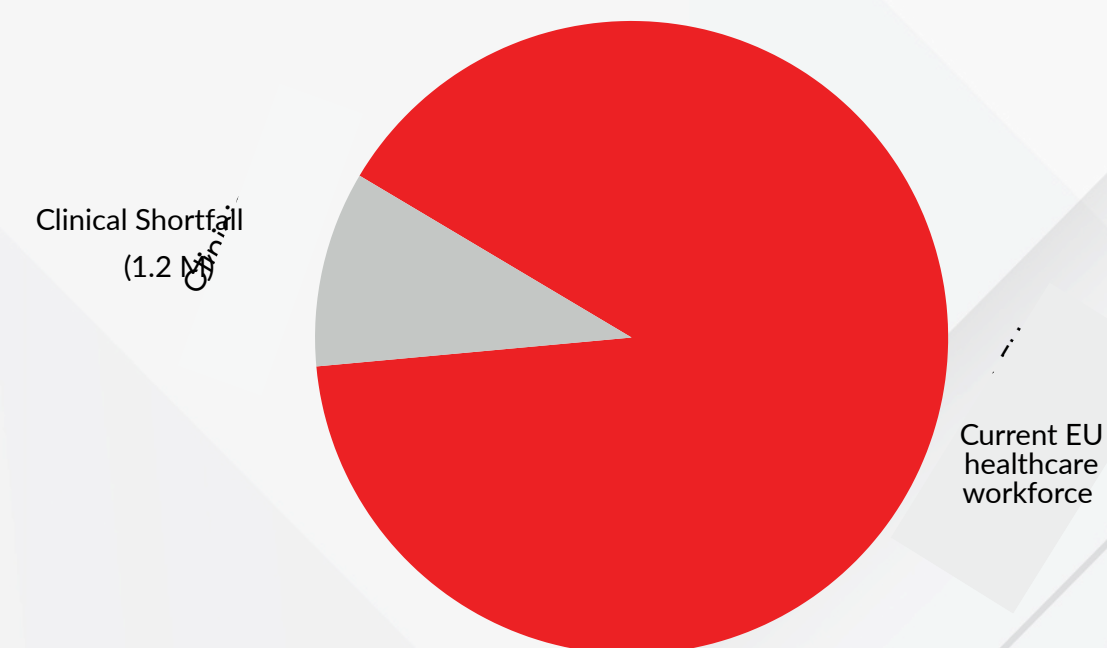
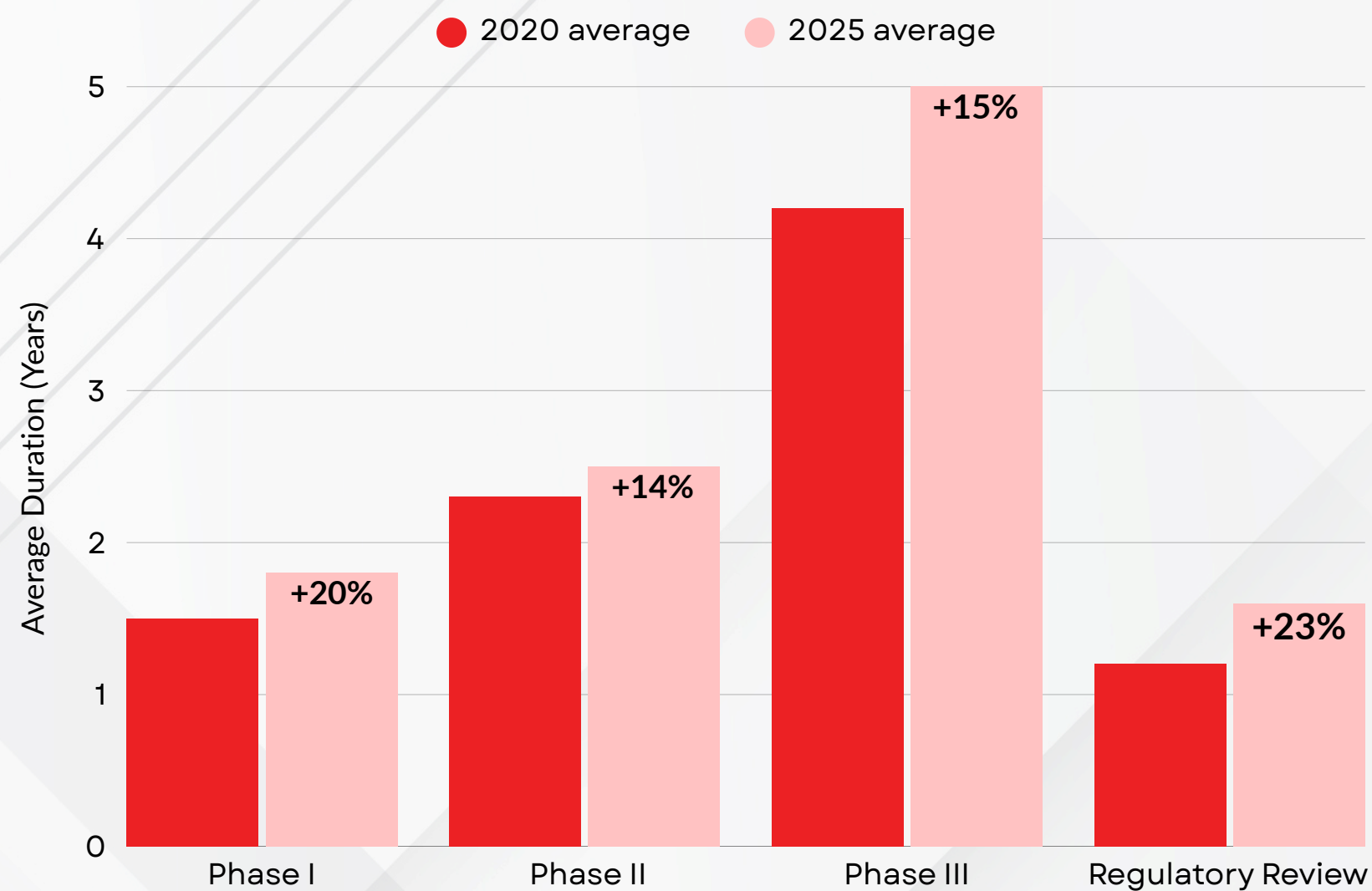


Figure 1.3: US Pharma Talent Indicators (2025) and EU Clinician Shortfall Source: PharmExec (2025), XBinsight (2024), European Commission / Medscape (October 2025)

Clinical Trial Timeline Inflation: 2020 vs 2025 Average Duration



R&D Cost Attribution per Asset (Illustrative, 2025)

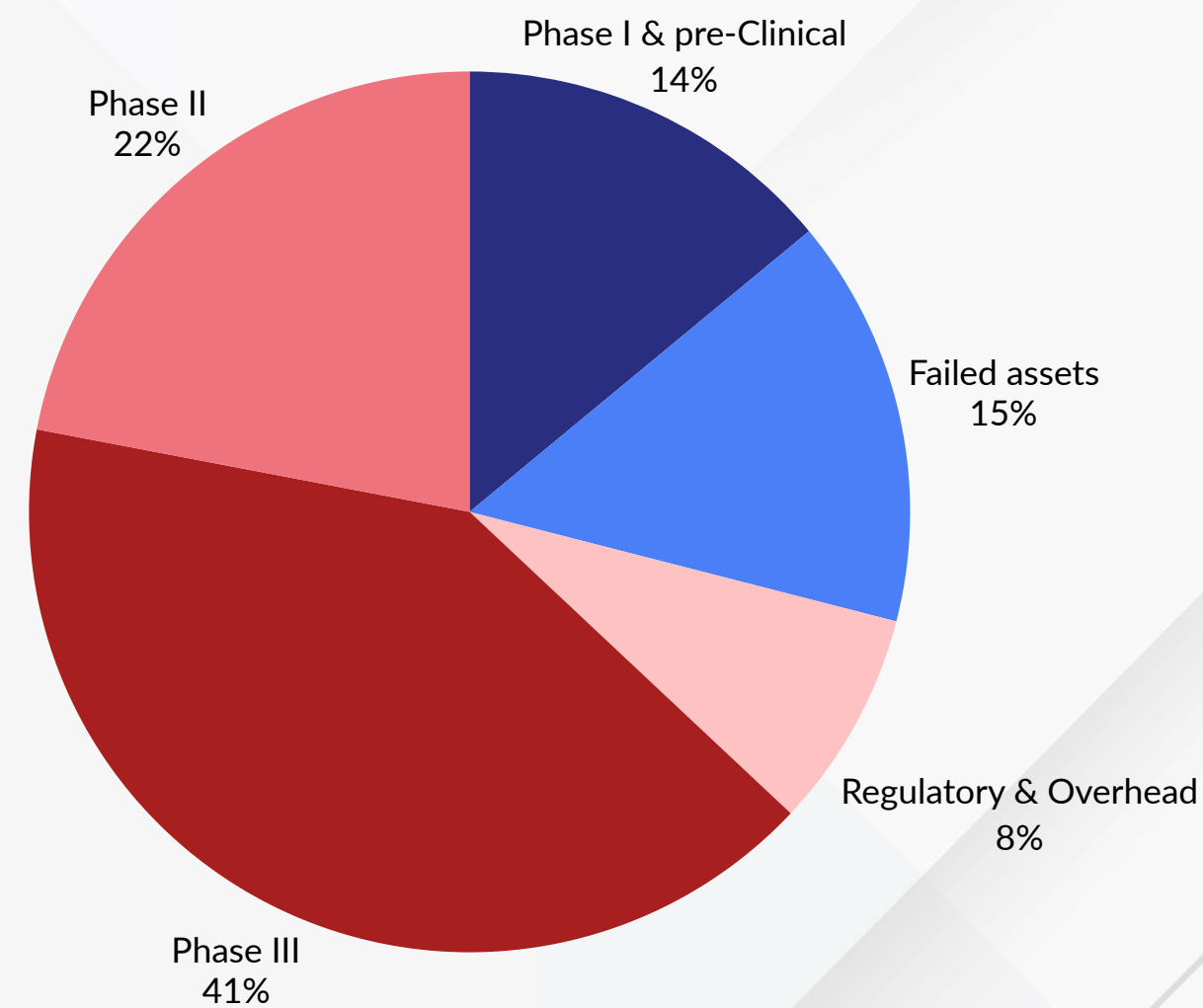


Figure 1.4: Clinical Trial Timeline Inflation (2020 vs 2025) and R&D Cost Attribution per Asset Source: Deloitte Pharma Innovation Report 2025; Tufts CSDD; RAND Study 2025

Mandate Migration: From IT Support to Operational Core

Healthcare GCCs in India have shifted from technology support functions to primary operational responsibility for **drug discovery workflows, global regulatory submissions, pharmacovigilance infrastructure, and clinical data management**. The migration has been documented across the largest life sciences GCCs, **AstraZeneca, Novartis, Sanofi, Abbott, and Baxter**, and is now visible in the functional composition of new GCC establishments.

Across the installed base, Indian GCCs manage **60% of global regulatory affairs for multinational life sciences firms, 54% of pharmacovigilance operations, and 45% of drug discovery and development workflows.**

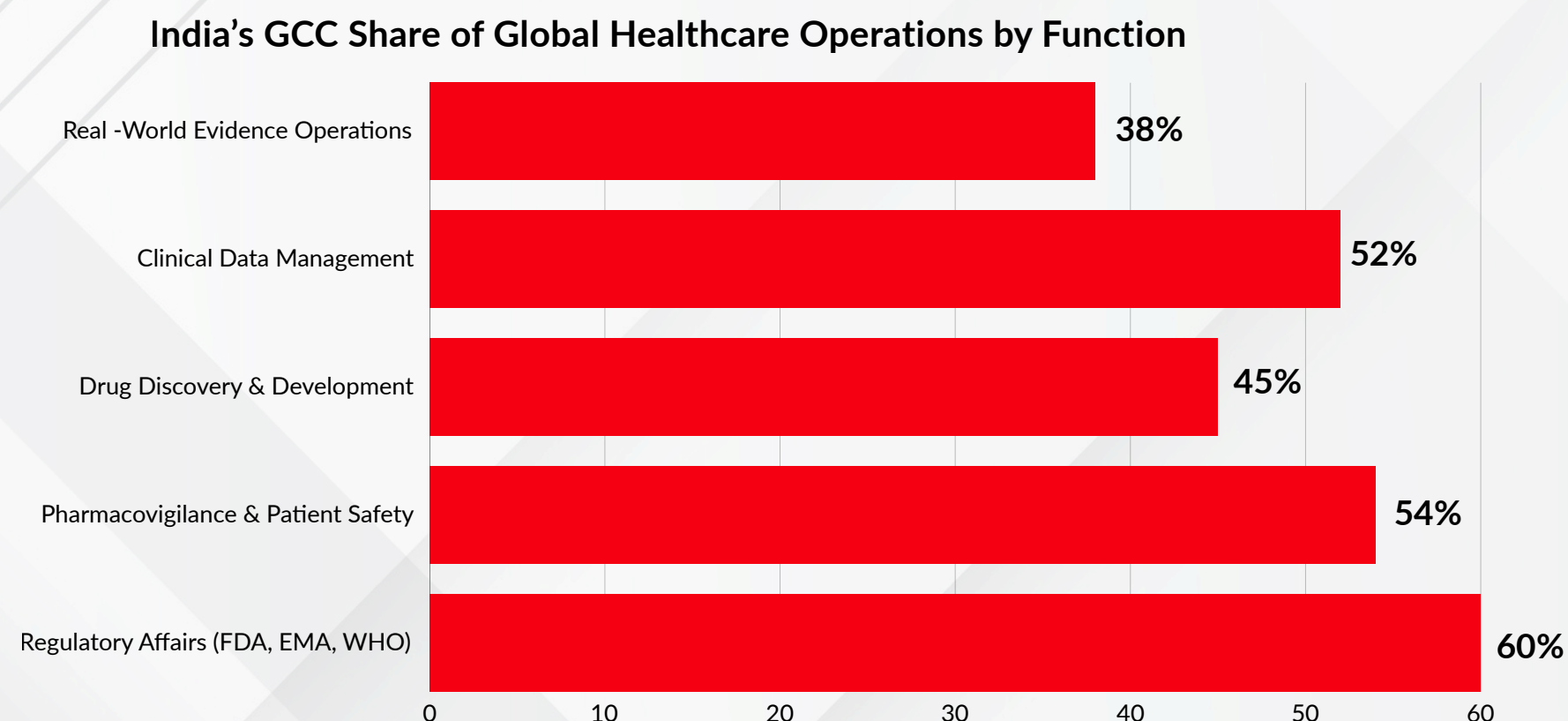


Figure 2.1: India's GCC Share of Global Healthcare Operations by Function. Source: Inductus GCC Healthcare Analysis (2026); NASSCOM Life Sciences GCC Report 2024



Drug Discovery and Development Workflows

The functional composition of India's life sciences and healthcare GCCs has undergone a fundamental structural realignment. Legacy hubs originally anchored in **transactional IT and back-office support** have **matured into Global Value Organizations (GVOs)**. These centers now hold **primary, end-to-end operational ownership** over high-complexity, core biopharma workflows, including:



- AI-driven molecular screening and computational chemistry



- End-to-end clinical trial data management and analytics



- Global regulatory dossier compilation (FDA, EMA, WHO submissions)



- Real-time pharmacovigilance signal detection

AI-assisted drug discovery is now embedded in the function: Indian GCCs use machine learning models for **ADMET (absorption, distribution, metabolism, excretion, and toxicity)** prediction, molecular docking simulation, and compound library optimization.

The revised **ICH E6(R3) Good Clinical Practice guideline, effective July 2025**, formalizes **risk-based and decentralized clinical trial oversight**, a model that positions India-based trial management teams as viable remote operations hubs for global Phase II and III studies.



The Evolution of AI: Key Milestones & Growth Trends

From foundational breakthroughs to real-world impact and global recognition.

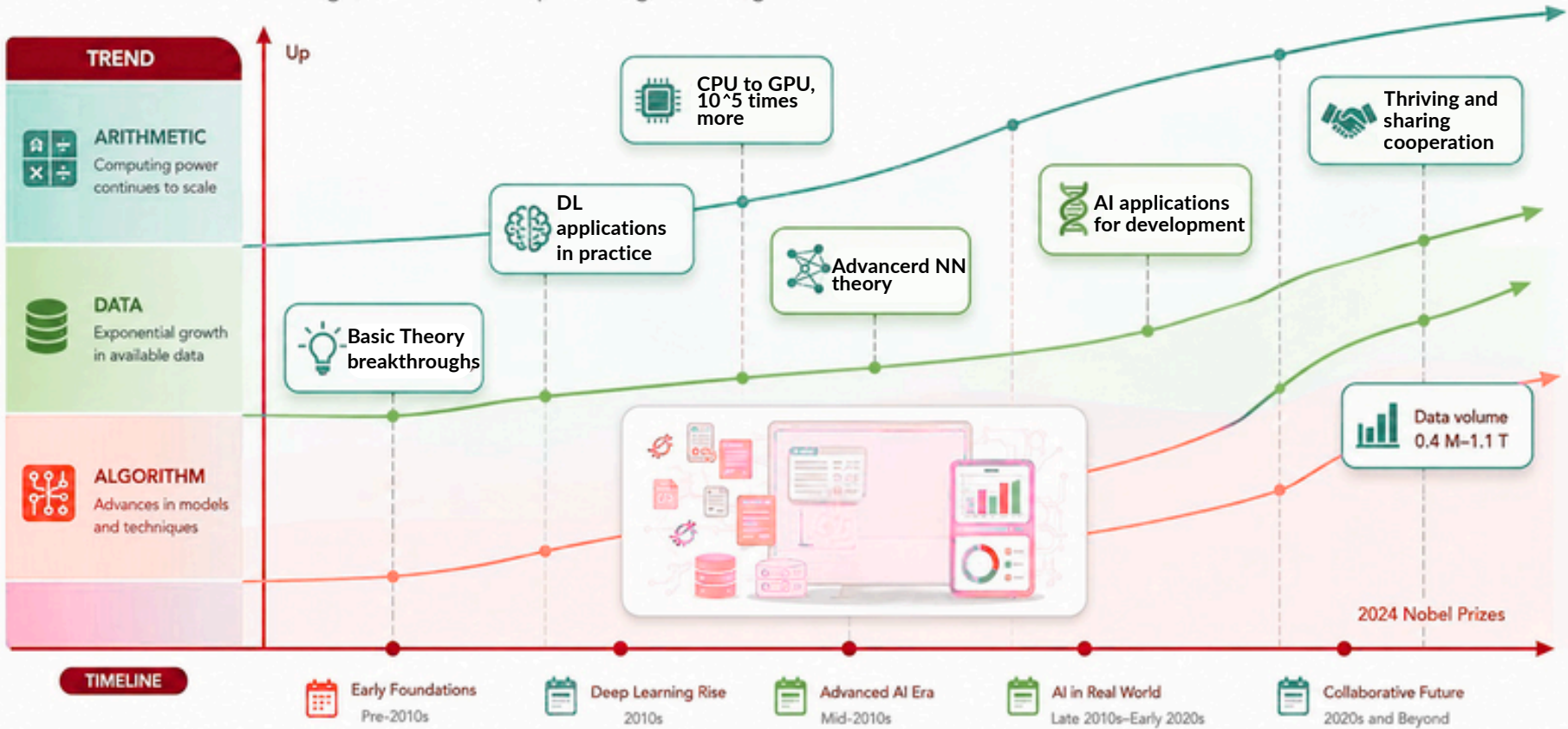
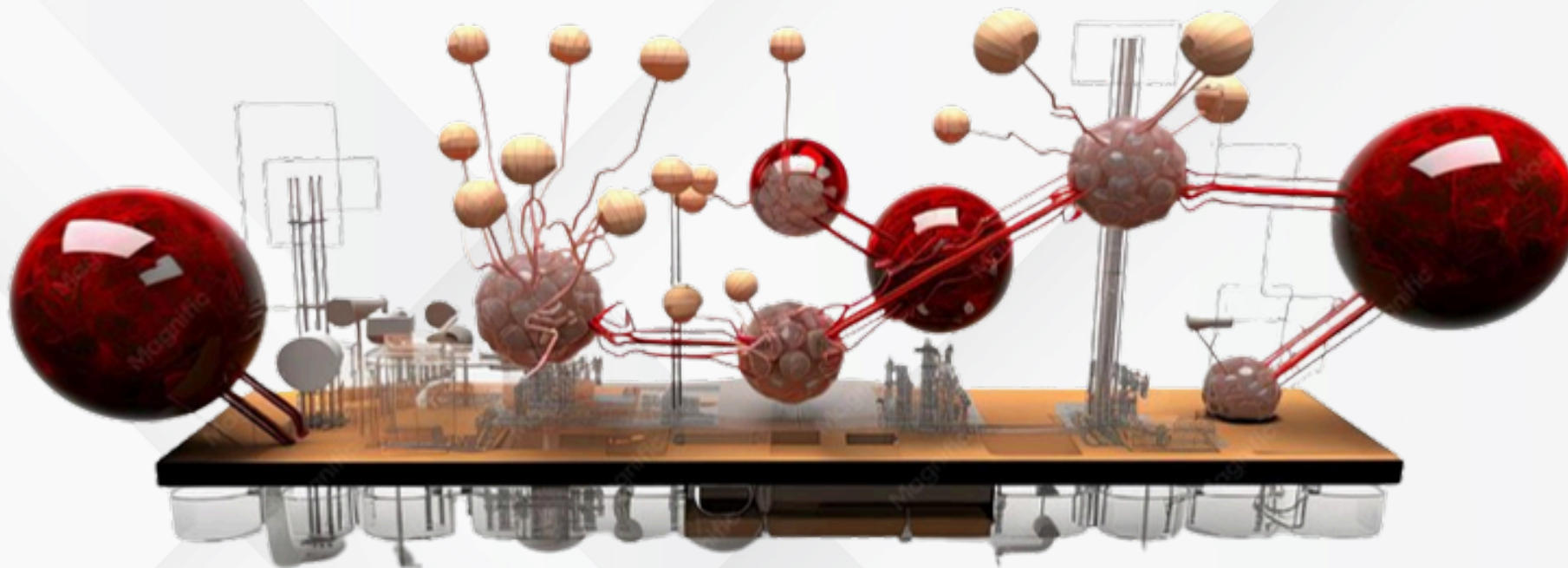


Fig. 2.2. Brief overview of artificial intelligence (AI) pharmaceutical development. DL: deep learning; CPU: central processing unit; GPU: graphics processing unit; NN: neural network. Source: ScienceDirect



Discovery Sub-function	India GCC Activity	Regulatory Context
Computational chemistry & ADMET	In silico screening, molecular modeling, and ADMET prediction using ML models	Supports IND filing data packages for US FDA and EMA
Preclinical data analysis	Toxicology data review, dose-response modelling, GLP study oversight	ICH M3(R2); IND/CTA submission support
Clinical trial management (remote)	Protocol design support, site management, data monitoring under ICH E6(R3)	ICH E6(R3) effective July 2025; risk-based oversight formalised
Biostatistics & programming	Statistical analysis plans, CDISC SDTM/ADaM datasets, SAS/R programming	FDA 21 CFR Part 11; EMA electronic submission standards
Medical writing	CSRs, IBs, protocols, NDA/BLA/CTD dossier sections	ICH M4 CTD structure; FDA eCTD and EMA NeeS formats

Sources: Inductus GCC Healthcare Analysis 2026; AstraZeneca press release (Chennai GIC inauguration, November 2024); ICH E6(R3), effective July 2025; ICH M3(R2), M4 CTD guidelines.

Global Regulatory Affairs: FDA, EMA, and WHO Operations

The global life sciences regulatory architecture has reached an operational inflection point, with **India-based GCCs now commanding 60% of all regulatory affairs workflows**. Operating primarily out of specialized hubs in Bangalore, Hyderabad, and Chennai, these centralized networks own end-to-end dossier lifecycles. This includes the **precise compilation, quality review, and electronic submission (eCTD) of critical IND, NDA, BLA, and MAA milestones across the FDA, EMA, and WHO frameworks**.

This infrastructure is pivotal in absorbing major compliance disruptions, most notably the EU pharmaceutical reform. As the EU transitions to an incentive-driven, modulated data exclusivity model (8 to 12 years) paired with strict supply-chain resilience mandates, Indian GCC compliance nodes are actively re-engineering product dossiers.

These teams are standardizing global assets to comply with the updated **Quality Review Documents (QRD), Summary of Product Characteristics (SmPC), and Patient Information Leaflets (PIL) protocols mandated by the EMA**.

Simultaneously, multinational sponsors are leveraging localized regulatory updates to fast-track market entry. Under the **August 2024 CDSCO Rule 101 notification, India officially waives local Phase III clinical trial requirements** for innovative therapies already approved by tier-1 global agencies (FDA, EMA, MHRA, PMDA, TGA, or Health Canada).

By removing the domestic data generation burden for high-priority categories like **orphan drugs and cell therapies**, global enterprises can reuse Western clinical packages to dramatically compress Indian launch timelines.

Agency	Submission Type	India GCC Activity	2024–2025 Update
US FDA	IND, NDA, BLA, ANDA	eCTD compilation, CMC modules, clinical summaries, REMS documents	21 CFR Part 11 electronic records; FDA IStand pilot for digital endpoints
EMA	MAA (centralised), MRP, DCP, PSUR	CTD/NeeS dossiers, PSUR preparation, RMP drafting, EPAR responses	EU Pharma Package 2025; SmPC/PIL/QRD changes; modulated exclusivity 8–12 years
WHO	Prequalification, Emergency Use Listing	PQ dossier assembly, site master files, bioequivalence data	WHO PQ programme operational; EUL experience from COVID products retained
CDSCO (India)	CTRI registration, IND, NDA	Local IND filing, trial waiver applications under August 2024 notification	August 2024: clinical trial waivers for drugs approved by US FDA, EMA, 4 others

Sources: Inductus GCC Healthcare Analysis 2026; EMA EU Pharma Package 2025; CDSCO notification on clinical trial waivers, August 2024; WHO PQ program; FDA 21 CFR Part 11.

Pharmacovigilance and Patient Safety Infrastructure

India-based GCCs now process **54% of all pharmacovigilance (PV) operations for multinational life sciences enterprises**. Moving far beyond legacy support, these hubs exercise full operational ownership over high-complexity safety workflows.

Teams directly manage **Individual Case Safety Report (ICSR) processing, signal validation, Periodic Benefit-Risk Evaluation Report (PBRER/PSUR) compilation, and Risk Management Plan (RMP) architecture** across global interfaces, including the FDA's FAERS, the EMA's EudraVigilance, and the WHO's VigiBase.

Signal detection has shifted from rule-based statistical methods to AI-assisted models that process large adverse event datasets against real-world sources, including electronic health records, social media, and insurance claims.

Indian GCC teams operate **24-hour ICSR processing cycles, structurally necessary for the 15-day serious adverse event reporting windows** required by the FDA and EMA.

The **Pharmacovigilance Programme of India (PVPI)**, coordinated by the **Indian Pharmacopoeia Commission (IPC)**, functions as an accredited WHO Collaborating Centre that pipes data into the WHO's Uppsala Monitoring Centre (UMC).

The above institutional framework ensures the domestic talent pool is systematically upskilled and credentialed directly in international ICH guidelines and global regulatory safety compliance.

PV subfunction	India GCC Scope	Regulatory Framework
ICSR processing	24-hour case intake, medical coding (MedDRA), narrative writing, regulatory reporting	FDA 15-day SAR; EMA EudraVigilance ICSR reporting; ICH E2B(R3)
Signal detection & evaluation	Disproportionality analysis, AI-assisted signal review, safety database management	EMA PRAC signal assessment; FDA FAERS; WHO VigiBase UMC Uppsala
PSUR / PBRER preparation	Benefit-risk narrative, cumulative exposure data, line listings, executive summary	ICH E2C(R2); EMA PSUR submission schedule; FDA PADER
Risk Management Plans	RMP drafting, routine and additional risk minimisation measures, RMP updates post-PSUR	EMA GVP Module V (RMP); Pharmacovigilance Risk Assessment Committee (PRAC)
Real-world safety surveillance	EHR data mining, patient registry analysis, AI adverse event extraction	ICH E2E; FDA Real-World Evidence Framework; EMA RWE Methodology Guidelines

Sources: Inductus GCC Healthcare Analysis 2026; EMA GVP Module V; ICH E2B(R3), E2C(R2); India PVPI / IPC; WHO Uppsala Monitoring Centre VigiBase; International Journal of Drug Regulatory Affairs, 2025.

Clinical Data Management and Real-World Evidence

Clinical data management (CDM) in India-based GCCs covers the full trial data lifecycle: **protocol-level CRF design, database build and validation (Medidata Rave, Oracle Clinical, Veeva Vault), data entry and query management, edit check programming, database lock, and CDISC SDTM/ADaM dataset delivery** for regulatory submission. India accounts for approximately **52% of global CDM operations** managed by multinational life sciences GCCs.

Real-world evidence (RWE) operations have expanded materially since the FDA's 2018 Real-World Evidence Framework and the EMA's corresponding methodology guidelines formalized RWE as a component of marketing authorization applications and post-approval label expansions.

Indian GCCs now operate RWE functions that include insurance claims analysis, EHR data curation, patient registry management, and outcomes research. India's 1.4 billion population and diverse disease burden provide a patient data environment that complements European cohort data, particularly for infectious disease, diabetes, and cardiovascular indications where Indian epidemiological profiles differ materially from Western populations.

CDM / RWE Function	India GCC Scope	Standard / Platform
CRF design & database build	eCRF design, validation scripts, UAT, go-live support	Medidata Rave, Oracle Clinical, Veeva Vault CDMS
CDISC dataset programming	SDTM and ADaM mapping, define.xml, reviewer's guide	CDISC SDTM v1.8; ADaM v1.3; FDA/EMA eCTD submission
RWE: claims & EHR analysis	Claims database analysis, EHR curation, propensity score matching, outcomes modelling	FDA RWE Framework (2018); EMA RWE Methodology Guidelines (2023)
Patient registries	Registry design, data collection, longitudinal follow-up, site coordination	ISPE GPP for Patient Registries; ICH E9(R1) estimands framework
Data governance & quality	Data management plans, DVP, edit check specification, audit trail maintenance	FDA 21 CFR Part 11; GCDMP (SCDM); ALCOA+ principles

Sources: Inductus GCC Healthcare Analysis 2026; NASSCOM Life Sciences GCC Report 2024; FDA Real-World Evidence Framework 2018; EMA RWE Methodology Guidelines 2023; CDISC standards (SDTM v1.8, ADaM v1.3); ICH E6(R3), E9(R1).

AI as Operating Infrastructure

Artificial intelligence entered Indian healthcare global capability centers as a data processing and analytics tool around 2019. By 2024-2025, it is embedded in **core R&D workflows: target identification, molecular screening, clinical trial design, real-world evidence analysis, and regulatory documentation**. The shift is measurable in timeline compression, cost structure, and the investment decisions of multinational pharmaceutical companies in choosing India as the location for AI-integrated drug development operations.

AI/ML Adoption Trajectory, 2019–2026

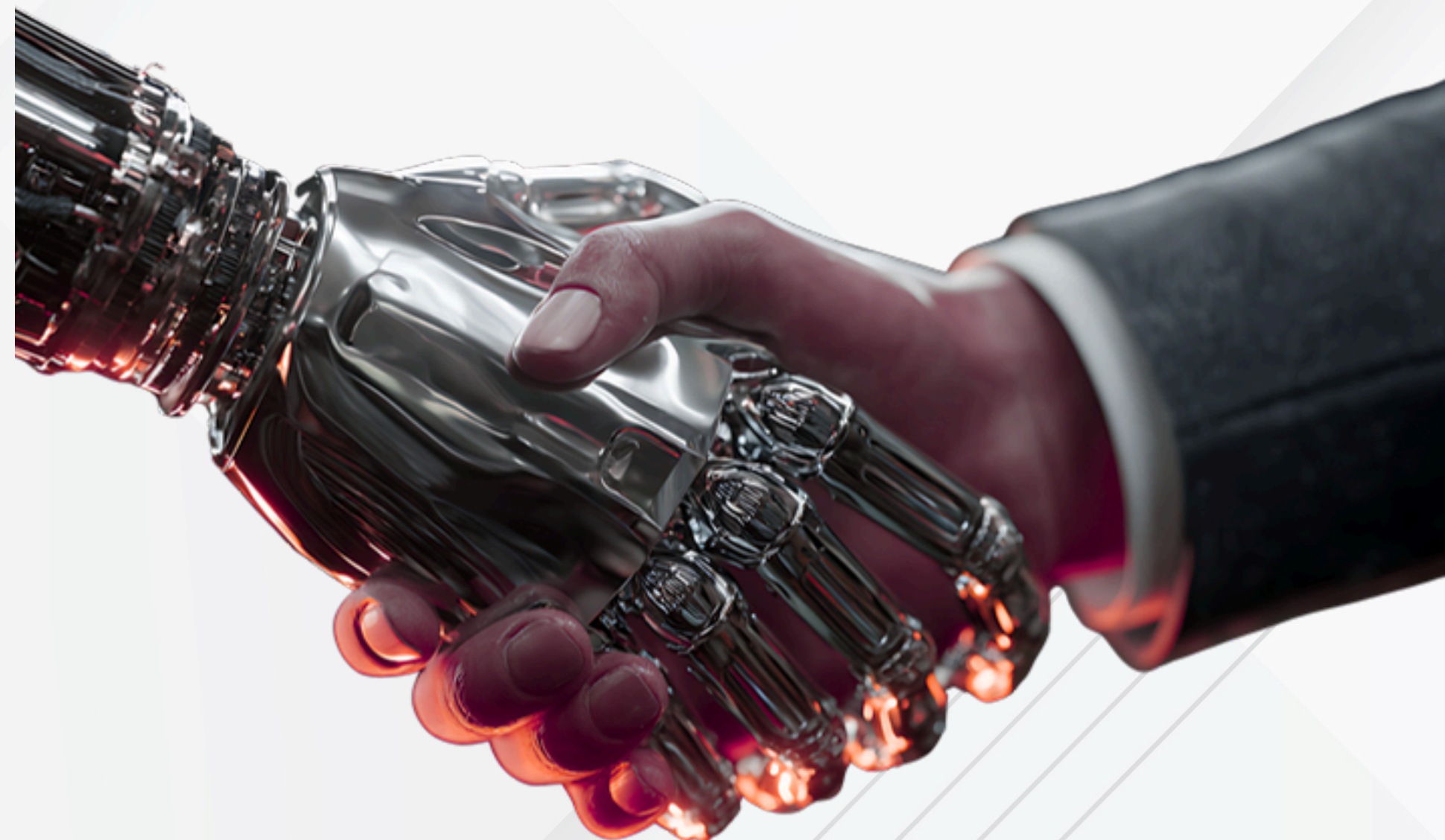
50% of Indian pharma firms running GenAI PoCs	25% have AI in live production environments	95+ healthcare GCCs with active AI/ML functions	USD 7B+ investment in India pharma AI GCCs
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In 2019, the predominant AI application in India's healthcare GCCs was retrospective data analysis: **processing clinical trial outputs, patient records, and supply chain data**. By 2022, generative and predictive models entered preclinical workflows.

The 2024 decision by **Bristol Myers Squibb** to invest USD 100 million in an India GCC dedicated to **AI-assisted drug discovery** marks a threshold: investment at that scale reflects operational confidence, not a pilot posture. **Novartis's Hyderabad Biome** and **Pfizer's and Johnson & Johnson's India GCCs** are similarly embedding AI into clinical trial design and target selection processes.

The **IndiaAI Mission**, approved by the Union Cabinet in March 2024 with a budget of INR 10,372 crore (USD 1.25 billion), provides the national computer and dataset infrastructure these operations require.

- **Pfizer and Johnson & Johnson GCCs in India:** AI deployed in clinical trial design, patient recruitment optimization, and regulatory submission workflows.
- **Novartis Biome, Hyderabad:** Focused on integrating AI into pharma R&D, including protein structure prediction and biomarker identification.
- **Bristol Myers Squibb:** USD 100 million GCC investment for AI-native drug discovery, announced in 2024.
- **Centre of Excellence for AI in Healthcare (IIT Delhi-AIIMS Delhi):** INR 330 crore, launched in 2025, focused on indigenous AI solutions for disease screening and diagnostics.



AI Drug Discovery: Market Size, India's Role, and 2032 Projections

Exponential Market Expansion

- The **global AI-powered drug discovery market** is experiencing hypergrowth, projected to reach **USD 15.5B to USD 18.6B by 2032 at a 30% CAGR**.
- The growth is driven by three structural pillars: **high-fidelity multi-omics datasets, scalable GPU compute infrastructure, and generative AI architectures capable of predicting compound binding affinities with >80% accuracy**.

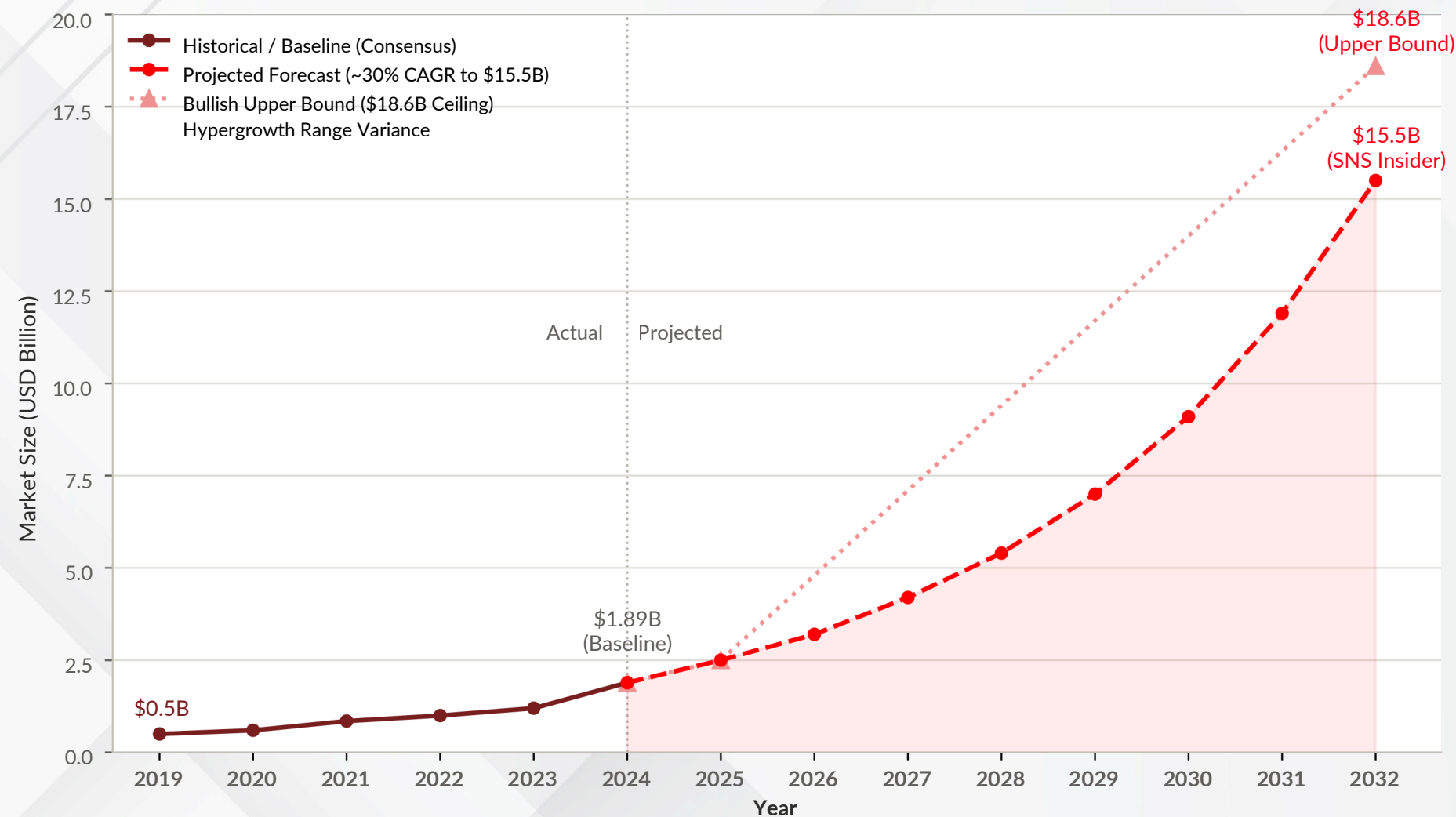
India's Strategic Pivot

- India has uniquely positioned itself as a premier global hub within this ecosystem, driven by a sharp transition from traditional generic manufacturing to proprietary, AI-led molecular discovery.
- The localized Indian AI drug discovery market is on track to hit **USD 22.8B by 2032 (24.6% CAGR)**, propelled by massive patient data pools, deep bioinformatics talent, expanding Global Capability Centers (GCCs), and aggressive deep-tech partnerships by pharmaceutical leaders like Dr. Reddy's and Lupin.

Value Realization & Regulatory Acceptance

- Mechanistically, generative design is compressing early-stage preclinical timelines by up to 60% while significantly lowering R&D costs.
- Regulatory bodies are validating this paradigm shift, increasingly treating AI-derived candidate hypotheses as scientifically credible inputs for accelerated clinical trial pipelines.

Global AI-Powered Drug Discovery Market Size Trajectory (2019-2032)
Aligned to Consensus Hypergrowth Data (15.5B-18.6B)



Computational Chemistry and R&D Cycle Compression

Compressing the Lead-Time Paradigm

- Conventional pharmaceutical pipelines require **11–12 years and USD 2.8 billion from target ID to IND filing**.
- AI-native computational workflows dismantle this timeline by shifting R&D architectures from **slow, sequential human validation to the parallel processing of multimodal multi-omics streams (genomic, proteomic, phenotypic, and chemical data sets simultaneously)**.

Empirical Proof of Concept

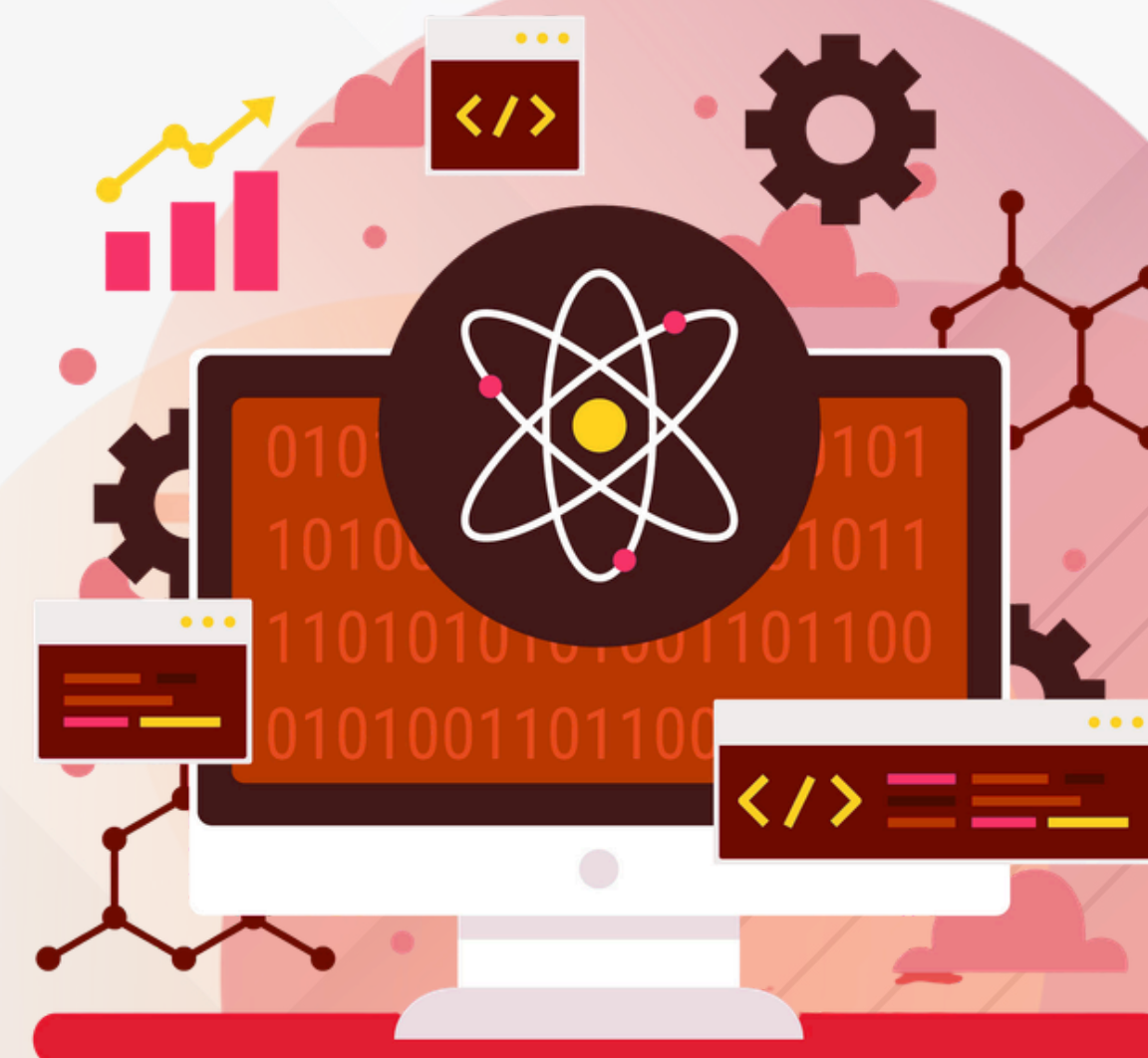
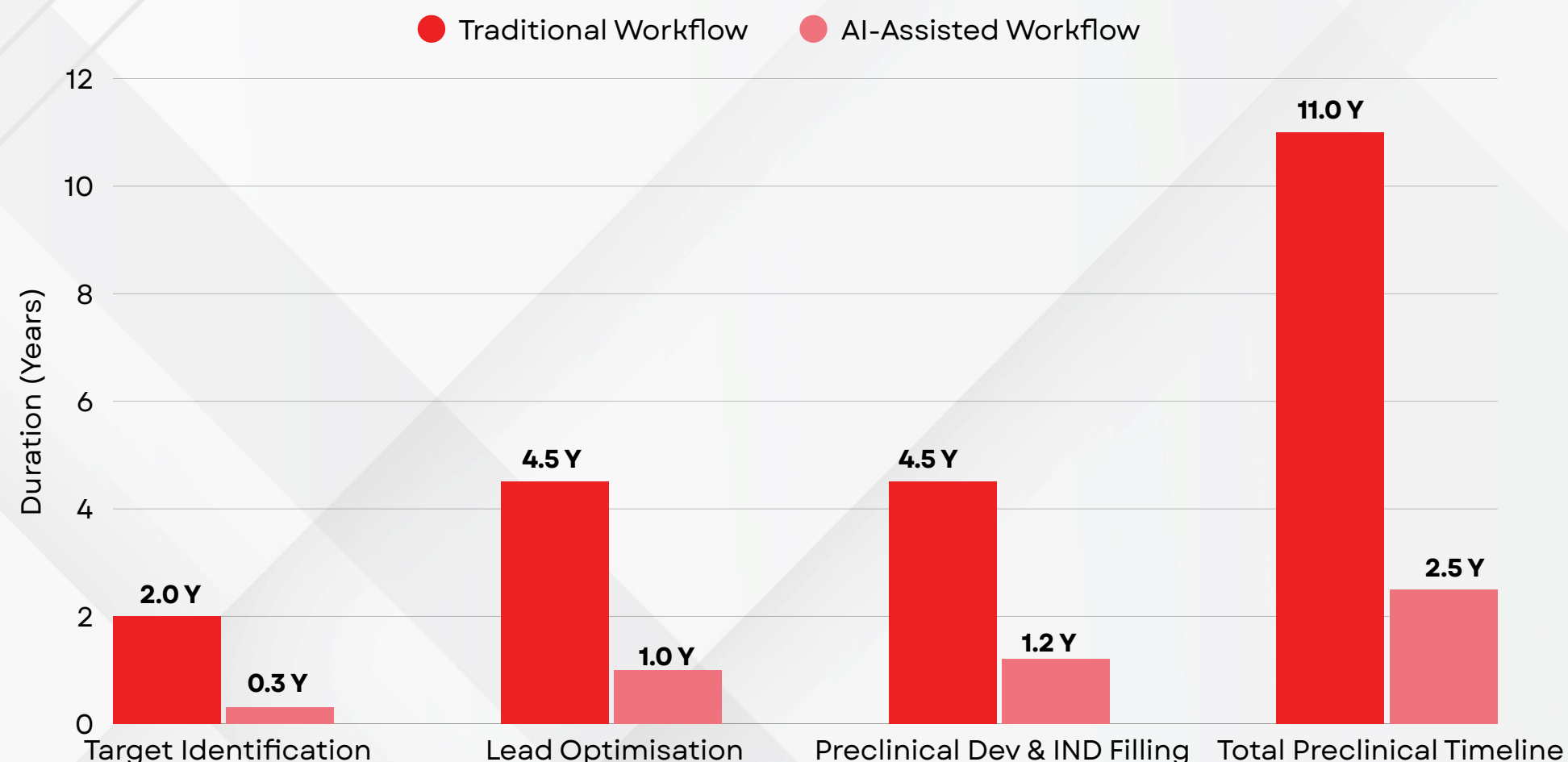
- Historical milestones validate this acceleration. **Insilico Medicine** delivered its first-in-class generative **IPF candidate from target identification to validation as a preclinical candidate in under 18 months**.
- Similarly, **Exscientia's core platform**, which drove its USD 688 million acquisition by Recursion Pharmaceuticals in late 2024, demonstrated a **70–75% reduction in early lead-optimization phases, moving assets like DSP-1181 into Phase I in just 12 months**.

The Indian GCC Value Proposition

- For GCCs in India, this workflow shift creates a powerful asymmetric economic advantage. By coupling localized, highly optimized **IndiaAI public compute clusters with an elite bioinformatics talent stack** operating at roughly one-third the operational cost of **US or European counterparts**, Indian pharmaceutical hubs are uniquely positioned to capture massive global R&D market share.

Note: While AI successfully compresses the preclinical funnel, early assets like **DSP-1181** highlight that velocity in discovery does not eliminate standard clinical trial attrition; structural focus must continue to expand toward predictive clinical trial design.

R&D Preclinical Timeline Compression: Traditional vs. AI-Assisted



India's Bioeconomy and the GCC Operating Layer

India's bioeconomy surged from **USD 10 billion** in 2014 to **USD 165.7 billion** in 2024 and officially reached a record market size of **USD 195.3 billion** in 2025. Registering a rapid annual growth rate of **17–18%**, the sector now contributes approximately **4.8%** to the national GDP, with the government targeting a valuation of **USD 300 billion** by 2030.

The market is split across **four primary subsectors** with the following updated sizes and shares:

Bio-Industrial:
USD 90.2
billion (~46.2%)

Bio-Pharma:
USD 64.5
billion (~33%)

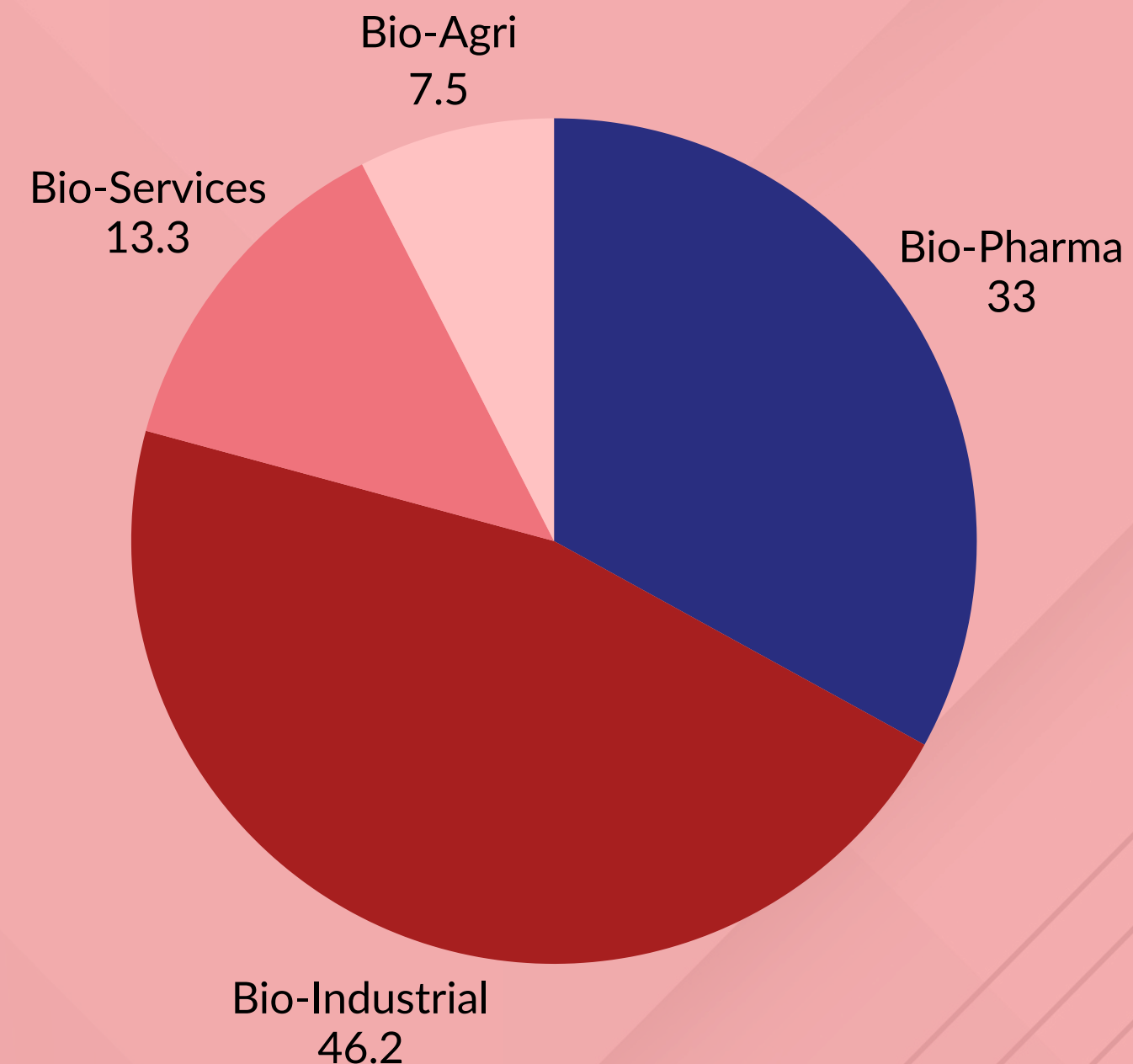
Bio-Services:
USD 26.0
billion (~13.3%)

Bio-Agri:
USD 14.6
billion (~7.5%)

The GCC ecosystem remains a critical execution layer for the industry, particularly within bioservices and biopharma. India currently serves as the essential infrastructure for **R&D, clinical trials, bioinformatics, and regulatory operations for global life sciences companies**. This momentum is further supported by the government's **BioE3 Policy**, which heavily drives **high-performance biomanufacturing and bio-AI hubs across the country**.

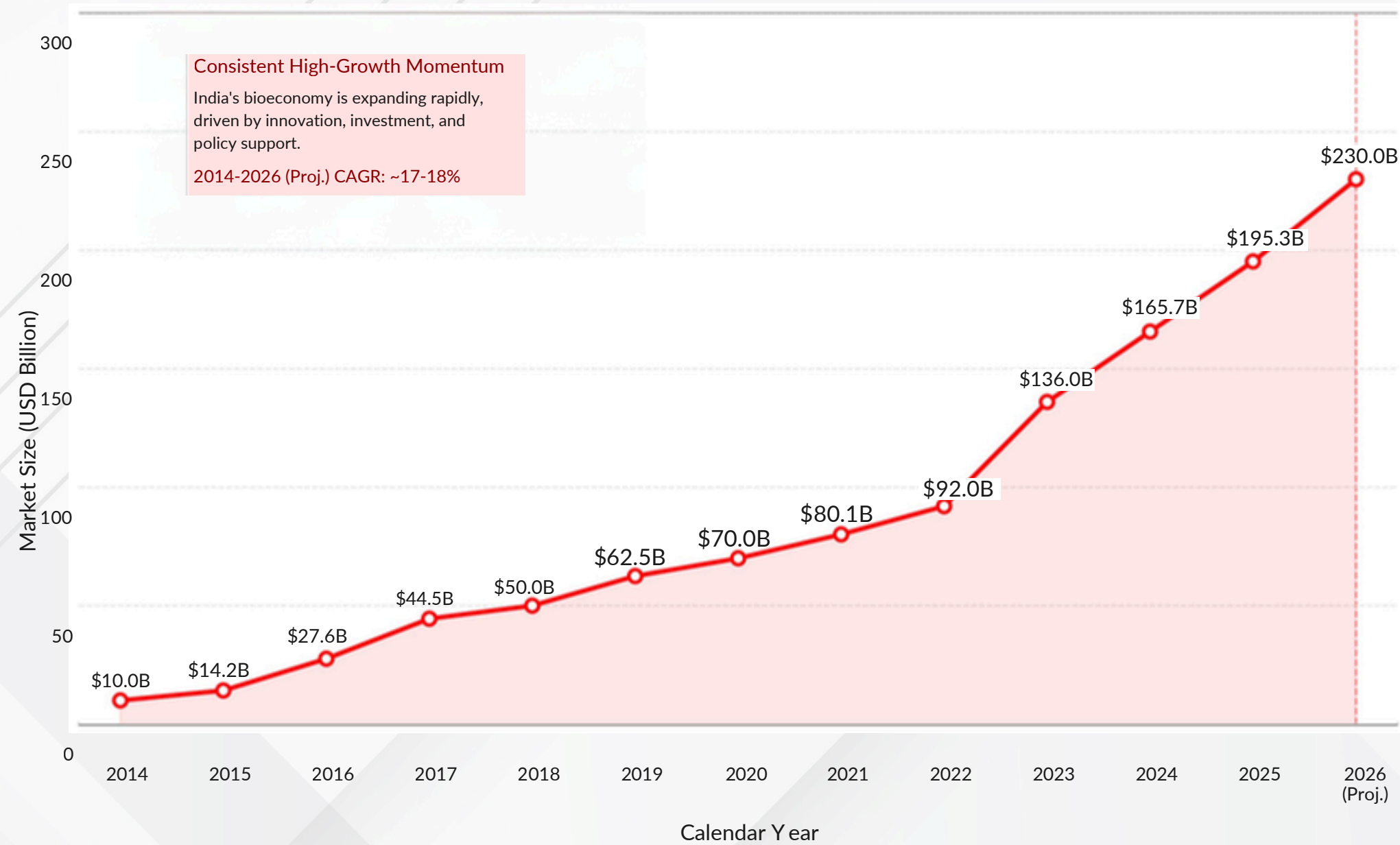
India's Bio-economy Sub-sector Breakdown

Market Size- \$195.3 Billion



India's Bioeconomy Growth Trajectory (2014 - 2026)

From USD 10.0B in 2014 to USD 230.0B in 2026 (Proj.) | ~17-18% CAGR (2014-2026)



Source: BIRAC - IndiaBioeconomyReport2025 | Projected values for 2025-2026

BioPharma at USD 64.5 Billion: Biosimilars, Peptides, and the Patent Dividend



Macro Valuation:

India’s biopharma sector remains the cornerstone of the national bioeconomy, valued at approximately **USD 64.5 billion**. The industry is strategically structured around **small-molecule generics, global vaccine manufacturing, biosimilars, and novel emerging biologics**.



Regulatory Landscape and Global Leadership:

On an approval-count basis, **India is a global leader in biosimilar accessibility**. The **Central Drugs Standard Control Organization (CDSCO)** has approved over **130 biosimilars**, outpacing the **US FDA's 51 approvals** and the **EMA's 115 approvals**. This deep portfolio allows domestic prices to sit 30% to 70% lower than reference products.



The Patent Dividend and Sovereign Exports:

Between **2025 and 2032**, a historic "patent cliff" will see **39 high-value biologics** lose exclusivity, including **five blockbusters generating over USD 10 billion each in global revenue**. Leading Indian manufacturers, including **Biocon, Dr. Reddy’s, Cipla, and Zydus**, are capturing this dividend by securing approvals for complex oncology and autoimmune biosimilars in highly regulated US and European markets.

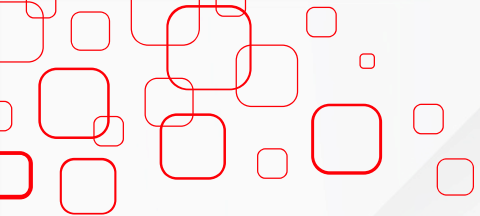


Next-Gen Growth Vectors:

The **peptide therapeutics segment** is projected to clock the highest **CAGR through 2035**. This exponential growth is catalyzed by the staggering global and domestic demand for oral and long-acting peptide formulations, specifically **GLP-1 receptor agonists targeted at diabetes and obesity management**.

Segment	Market Size / Status	Key Metric	Reference
Biosimilars (India domestic)	USD 866M (2024) → USD 1.5B (2025E)	CAGR 19.9% to 2033	IndiaPharmaOutlook, 2025
Approved biosimilars (India)	135 approved as of Jan 2025	More than US FDA + EMA combined	BioSpectrum, April 2025
Patent cliff opportunity	39 biologics off-patent, 2025–2032	5 molecules >USD 10B annual revenue each	BioSpectrum, April 2025
Monoclonal antibodies	55% of India's biosimilar market share	Dominant: oncology, autoimmune	ResearchAndMarkets, Feb 2026
Global biosimilars market	USD 40.4B (2025) → USD 176B (2034)	CAGR 17.78%	Precedence Research, 2025

Sources: IndiaPharmaOutlook 2025; BioSpectrum India, April 2025; ResearchAndMarkets, Feb 2026; Precedence Research, 2025; IBEF Biosimilars Boom, Sept 2025.



BioServices and the GCC Contribution

The **BioServices** segment, comprising **R&D services, clinical data management, bioinformatics, and regulatory affairs**, constitutes roughly **13% of India's overall bioeconomy revenue**. However, it commands a disproportionately dominant share of GCC activity due to high-value talent availability.

India's expanding cluster of pharma and life sciences GCCs operates deeply within this segment. They provide **high-end clinical trial data management, bioanalytical method development, real-world evidence (RWE) processing, and regulatory submission support** for major US and European pharmaceutical clients.

Bengaluru, Hyderabad, and Mumbai host approximately **85% of these healthcare and healthcare IT specialized capability centers**. Hyderabad has successfully solidified its position as the premier life sciences GCC hub, heavily anchored by the Telangana government's targeted R&D infrastructure and integration with the **mature Genome Valley cluster**.

Driven by a shift toward digital health, the **Research and IT services segment, specifically cross-functional areas like bioinformatics, centralized statistical monitoring, and clinical trial software development**, has emerged as the fastest-growing niche within the national bioservices ecosystem.

Indian GCCs are capturing increasingly complex mandates, including **AI-driven drug discovery analytics and localized decentralized clinical trial (DCT) governance**.



Policy Enablers: BioE3, Biopharma Shakti, and the RDI Fund

Policy Instrument	Scope and Mechanism	Relevance to GCC Operations
BioE3 Policy	Establishes shared biomanufacturing hubs, biofoundry clusters, and integrated bio-AI hubs bridging artificial intelligence with advanced biological research.	Bio-AI Hubs provide plug-and-play compute and wet-lab infrastructure, significantly reducing upfront CAPEX for GCCs expanding into computational biology.
Biopharma SHAKTI (New Framework)	₹10,000 crore national initiative accelerating production of biologics, mRNA, and biosimilars. Establishes 1,000+ accredited clinical trial sites and speeds up CDSCO regulatory clearances.	Provides GCCs with a massive, localized clinical research footprint and streamlined regulatory pathways for international filings and real-world evidence (RWE) generation.
IndiaAI Mission	Allocates ₹10,372 crore to provision scalable GPU compute clusters, curated public datasets, and healthcare-focused AI application development initiatives.	Grants subsidized, high-performance compute access, slashing foundational cloud infrastructure costs for GCC teams building localized AI-native drug discovery workflows.
SEZ & Biotech Parks	Specialized economic zones offering tax exemptions, duty-free laboratory equipment imports, and dedicated BSL-2/BSL-3 shared infrastructure in key states.	Serves as the default physical blueprint for GCC setups, driving down effective operational tax rates while eliminating complex supply chain barriers for biological imports.

Talent Architecture and Workforce Composition

India's healthcare and life sciences GCC workforce has scaled to over 300,000 professionals across 95+ specialized centers. This talent pool accounts for approximately 15% of the country's total GCC workforce.

The current workforce composition is balanced across three distinct pillars:



Tech & Digital Transformation (~45%):

Software engineering, data engineering, cloud infrastructure, and AI/ML model development.



R&D & Clinical Research (~30%):

Biostatisticians, clinical data managers, and regulatory affairs specialists.



Global Business Services & Operations (~25%):

Supply chain management, medical coding, global finance, and healthcare procurement.

Workforce by Function: Clinical, Regulatory, Bioinformatics, Analytics

150+ Healthcare GCCs in India	300,000+ Professionals	43% Core Healthcare & R&D share	420,000+ Projected workforce (2030F)
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The core healthcare and R&D functions comprise clinical trial management, pharmacovigilance, regulatory submissions, medical writing, biostatistics, and bioinformatics.



The Skills-First Architecture:

With technical skill half-lives compressed to approximately three years, driven by rapid advances in AI, cloud computing, and data science, conventional role-based hiring has proven inadequate. A dynamic skills-first architecture has emerged, prioritizing demonstrated competencies, continuous upskilling, and cross-functional mobility over static job descriptions. **Internal talent marketplaces, micro-credentialing, and edtech partnerships** ensure the workforce remains perpetually ahead of the capability curve.

Functional Distribution:

Legacy BPM, characterized by high-volume, rules-based transactions, has been systematically automated via RPA and workflow digitization. Liberated talent has been redeployed into three strategic pillars: Domain-Intensive Operations (**pharmacovigilance, regulatory intelligence, and medical information**); **Data and Analytics** (clinical data management, biostatistics, real-world evidence); and **Digital Innovation** (AI/ML platforms and automation solutions).

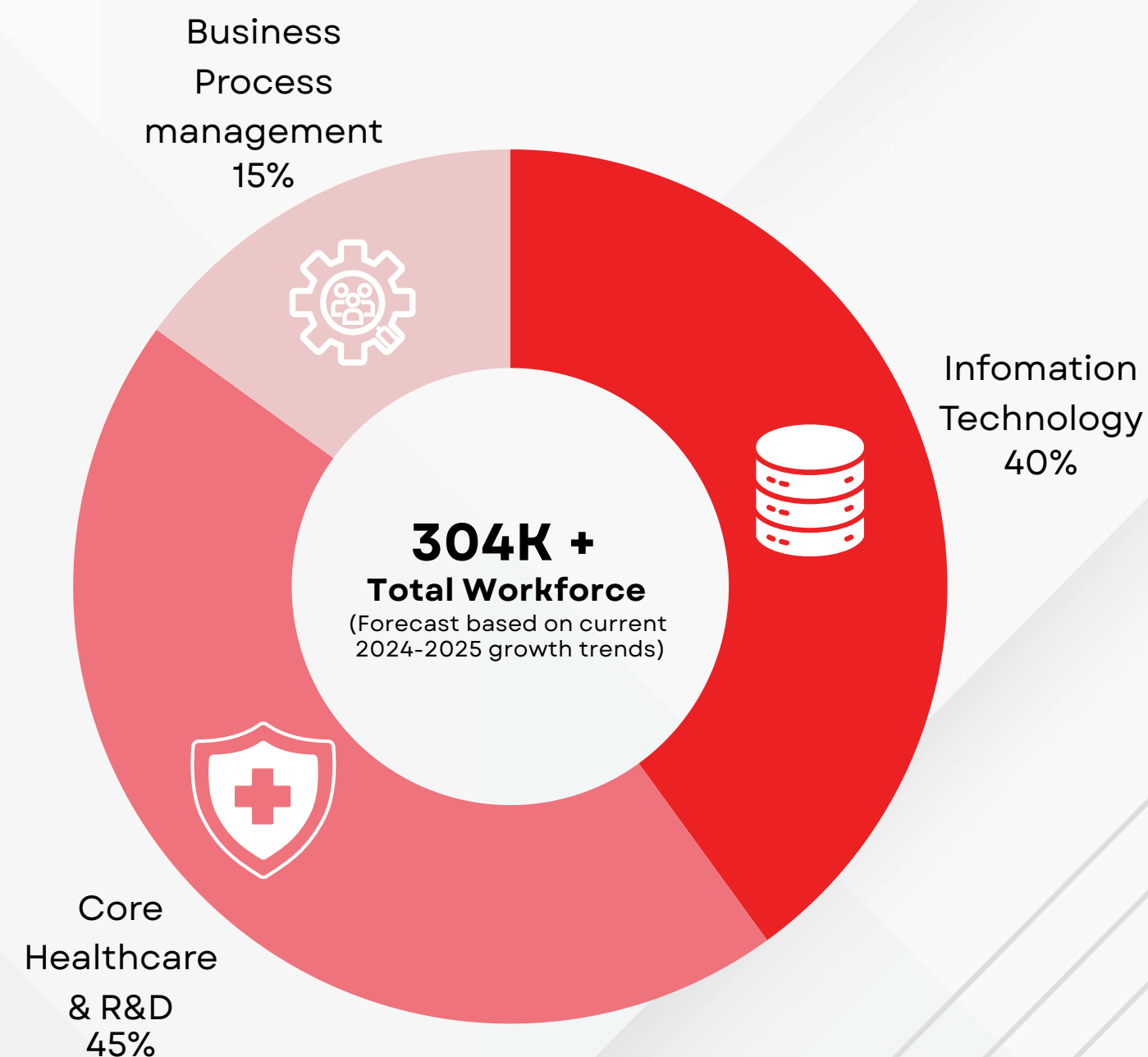
Hybrid Profiles: The New Premium:

The highest talent demand centers on hybrid profiles bridging domain expertise with technical fluency.

- **Software Engineers** (Healthcare Interoperability): **HL7 FHIR and DICOM** expertise for seamless data exchange across EHRs and trial systems.
- **Clinical Data Scientists**: Biostatistics + machine learning for adaptive trials and predictive biomarker discovery.
- **Computational Biologists**: High-performance computing for biological modeling and target validation.
- **Regulatory Technologists**: Regulatory affairs + data science for intelligent dossier structuring and AI-assisted authority responses.

These professionals are driving **AI-native drug discovery, embedding AI across target identification, trial simulation, patient stratification, and post-market surveillance**, transforming India's healthcare GCC from a cost-arbitrage destination into a front-office innovation partner.

Healthcare GCC Workforce by Function (India, 2026e)



Source: BW Healthcare World 2024 and Updated India GCC Outlook 2026 report

Enterprise AI Talent: India's Global Position

As a global epicenter for digital transformation, India's GCC ecosystem hosts over **120,000 dedicated AI/ML professionals**, establishing the world's largest single-country concentration of enterprise AI talent outside the United States. Propelled by an AI skill penetration rate that stands at **2.5 times the global average**, these centers have matured from operational hubs into AI-native innovation engines.

Within the Healthcare and Life Sciences (HLS) vertical, India-based GCCs are driving high-value intelligent orchestration across three core subdomains:



Drug Development Informatics:

Leveraging generative AI and deep learning for clinical trial optimization, advanced pharmacovigilance (**automated safety signal detection**), and automated regulatory document generation to accelerate time-to-market.



Digital Health Engineering:

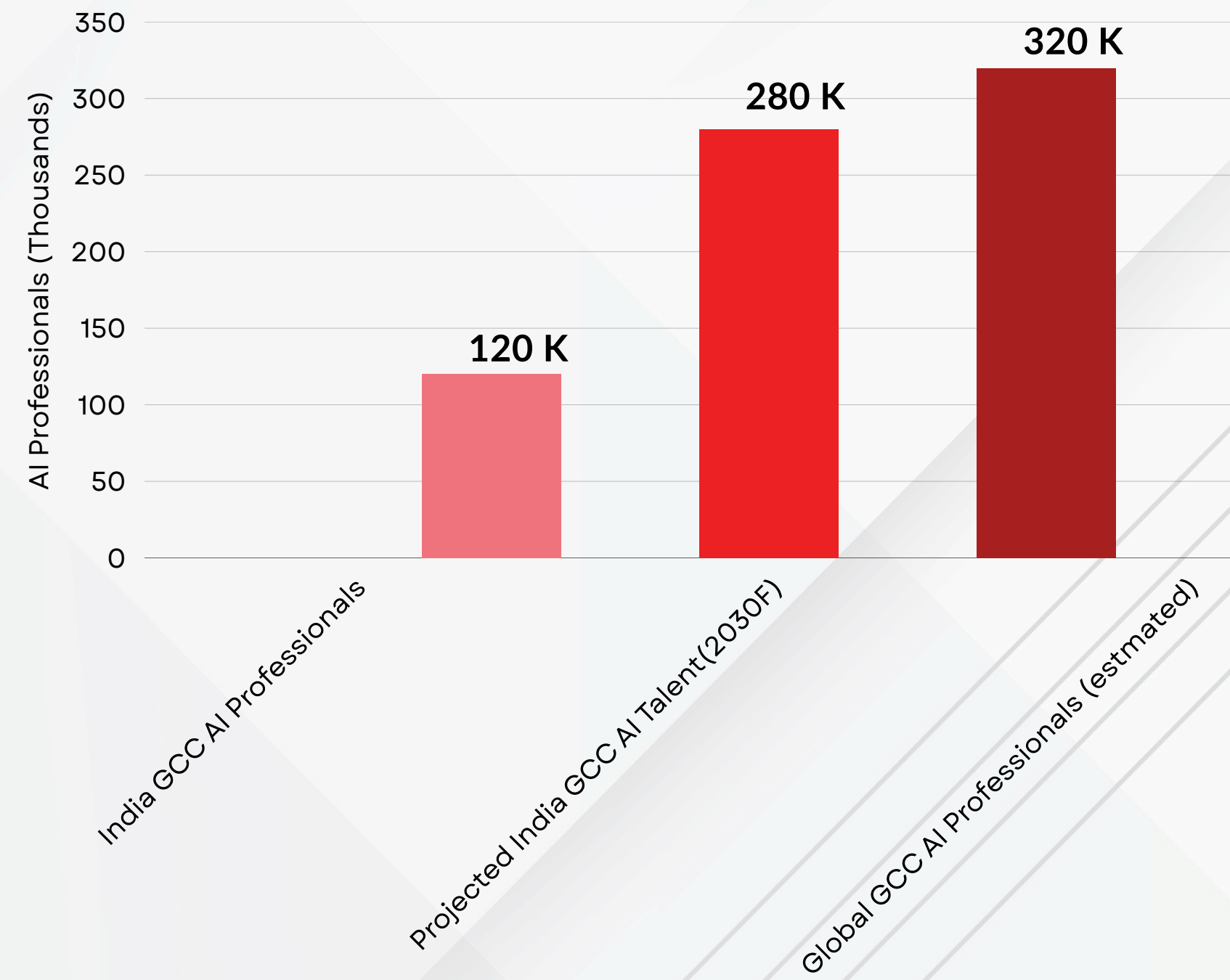
Designing and scaling next-generation **Software as a Medical Device (SaMD)**, **Internet of Medical Things (IoMT)** remote monitoring platforms, clinical decision support systems (CDSS), and AI-driven interoperability frameworks compliant with global healthcare data standards (e.g., FHIR).



Commercial Analytics & Real-World Evidence (RWE):

Utilizing **predictive modeling** for market access, pricing optimization, lifecycle management, and **patient outcomes analytics** to deliver hyper-targeted, value-based healthcare strategies globally.

AI Talent in GCC Ecosystem - India vs Global



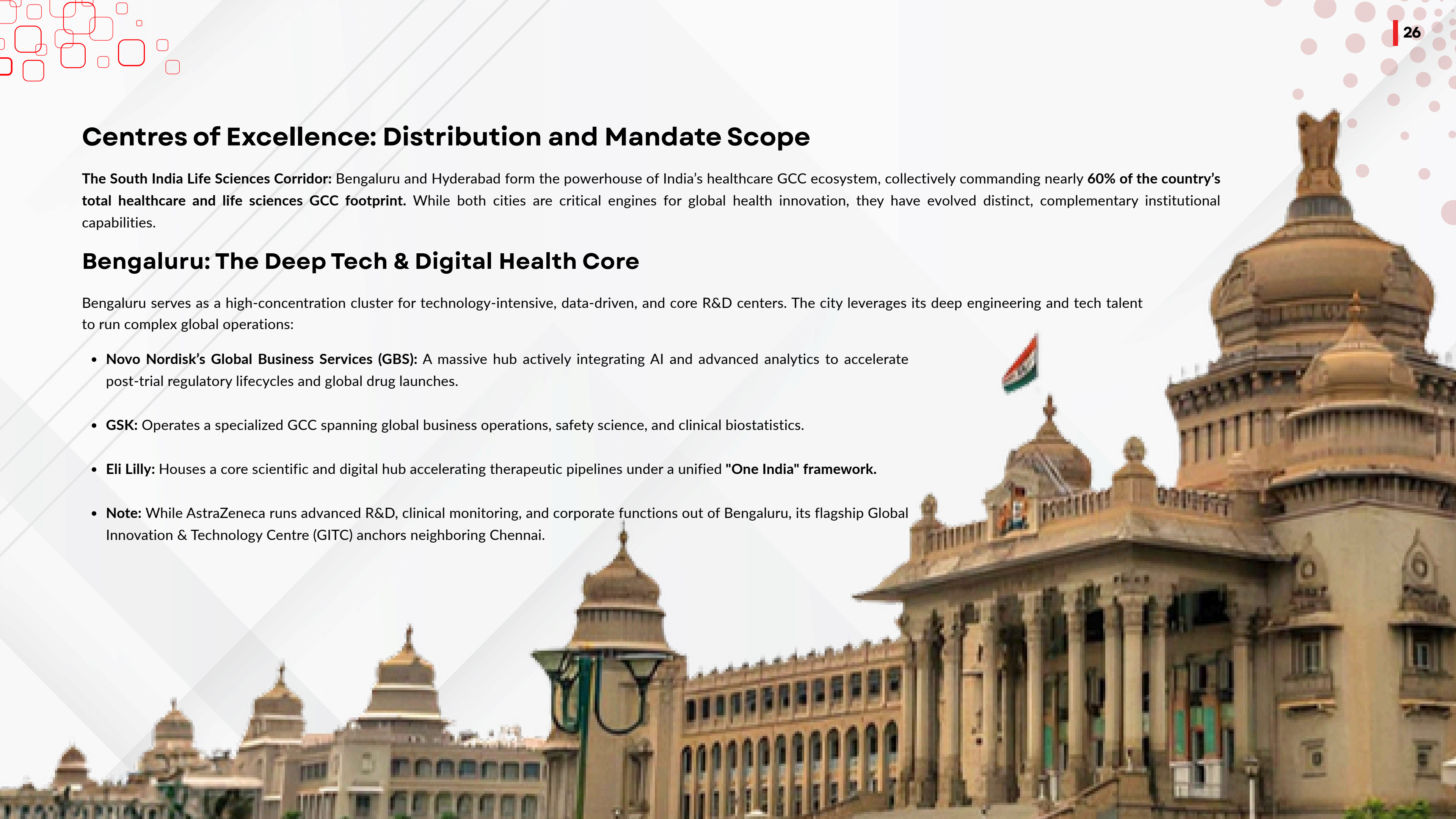
Centres of Excellence: Distribution and Mandate Scope

The South India Life Sciences Corridor: Bengaluru and Hyderabad form the powerhouse of India's healthcare GCC ecosystem, collectively commanding nearly **60% of the country's total healthcare and life sciences GCC footprint**. While both cities are critical engines for global health innovation, they have evolved distinct, complementary institutional capabilities.

Bengaluru: The Deep Tech & Digital Health Core

Bengaluru serves as a high-concentration cluster for technology-intensive, data-driven, and core R&D centers. The city leverages its deep engineering and tech talent to run complex global operations:

- **Novo Nordisk's Global Business Services (GBS):** A massive hub actively integrating AI and advanced analytics to accelerate post-trial regulatory lifecycles and global drug launches.
- **GSK:** Operates a specialized GCC spanning global business operations, safety science, and clinical biostatistics.
- **Eli Lilly:** Houses a core scientific and digital hub accelerating therapeutic pipelines under a unified **"One India" framework**.
- **Note:** While AstraZeneca runs advanced R&D, clinical monitoring, and corporate functions out of Bengaluru, its flagship Global Innovation & Technology Centre (GITC) anchors neighboring Chennai.



Hyderabad: The Integrated Pharma & Payer Capital

Leveraging the physical infrastructure of the Genome Valley life sciences cluster and the tech density of the **HITEC City / Gachibowli corridor**, **Hyderabad** has emerged as the premier location for end-to-end pharmaceutical value chains, large-scale medical operations, and US health enterprise delivery centers:

Sanofi:

Anchors the city with a monumental global hub expansion, scaling up to 4,500 professionals focusing on digital R&D, commercial analytics, and medical affairs.

Eli Lilly:

Expands the company's footprint with localized capabilities in process/peptide engineering and analytical development.

US Payer & Provider Ecosystems:

Gachibowli and Madhapur play host to massive operations from major US health systems and insurance giants, highlighted by UnitedHealth Group (Optum) and Providence Global Center, which test, scale, and deliver cloud engineering, cybersecurity, and care-delivery solutions for millions of US patients.



City / Cluster	Estimated LSHC Centers	Primary Strategic Mandate	Core Anchors & Notable Centres
Bengaluru	~35 centers	Core digital health engineering, AI-driven drug discovery, deep tech analytics, and global regulatory lifecycles.	Novo Nordisk GBS, GSK GCC, Eli Lilly (LCCI BLR), Novartis, and AstraZeneca (GBS & Clinical Operations).
Hyderabad (Genome Valley / HITEC City)	~25 centers	Biomanufacturing-adjacent support, clinical data management, US payer (insurance) & provider operations, and cloud infrastructure.	Sanofi Global Hub, Eli Lilly (LCCI HYD), Evernorth (Cigna), HCA Healthcare, Medtronic, and Bristol Myers Squibb.
Mumbai & Pune	~20 centers	Commercial analytics, global supply chain optimization, pharmacovigilance, regulatory compliance.	Bayer, Novartis Commercial Operations, Pfizer, Merck, J&J, and Abbott.
Chennai	~12 centers	Advanced software R&D, specialized bioinformatics, pharmacovigilance, and API analytics.	AstraZeneca GITC (Flagship), Pfizer Drug Development Center, Roche, and Lonza.
Emerging Tier-II (Ahmedabad, Kochi, Coimbatore)	Growing Cluster	Business Process Management (BPM), medical coding, healthcare IT support, foundational compliance reporting.	Context: Part of the wider micro-office movement wave; Tier-II/III hubs are projected to capture up to 39% of India's overall GCC workforce across all sectors by 2030.



Capital Deployment and Enterprise Commitments

Capital deployment by multinational healthcare and life sciences enterprises into India's GCC ecosystem reflects board-level, long-term operational decisions rather than exploratory investments. By the close of 2025, aggregate multi-year capital commitments targeting dedicated healthcare GCC infrastructure, high-compute digital environments, and localized R&D capacity exceeded USD 1.5 billion.

Strategic Reorientation Overview



IP Retention

Deciding whether to keep intellectual property in-house or outsource it.

AI Realization

Implementing ethical AI solutions and clinical simulations.

Infrastructure Scale

Investing in large-scale infrastructure to support growth



Capital Allocation Vectors

These board-sanctioned investments are being deployed into three core pillars:

- **Advanced Digital & Lab Infrastructure:** Funding the creation of secure, specialized execution environments for clinical biostatistics, pharmacovigilance tracking, and next-generation AI/machine learning drug lifecycle discovery pipelines.
- **Grade-A Enterprise Real Estate:** Transitioning to high-density, smart workplaces optimized for technological collaboration, as evidenced by major workspace expansions in South India's premium tech corridors.
- **Multi-Year Talent Pipelines:** Investing heavily in global capability scaling, transforming India-based operations from corporate back-offices into central nodes holding genuine global decision-making and leadership mandates.

High-Conviction Corporate Anchors

Rather than relying on transient operational budgets, these long-term commitments are codified in multi-year corporate roadmaps:

- **Sanofi:** Spearheading the sector's capital commitment with a landmark €400 million (~USD 440 million) expansion plan for its Hyderabad Global Hub, prioritizing the scaled deployment of ethical artificial intelligence across its global drug value chain.
- **Bristol Myers Squibb:** Anchoring its local presence via a dedicated USD 100 million investment to fund its Science & Technology Innovation Center, focusing heavily on digital innovation and global drug development.
- **AstraZeneca & Novartis:** Maintaining substantial infrastructure outlays to support large-scale, high-value workforces such as AstraZeneca's newly expanded Global Innovation and Technology Centre (GITC) and Novartis's deeply integrated asset management and operational centers.

Key Healthcare Enterprise GCC Commitments in India (2014-2025)

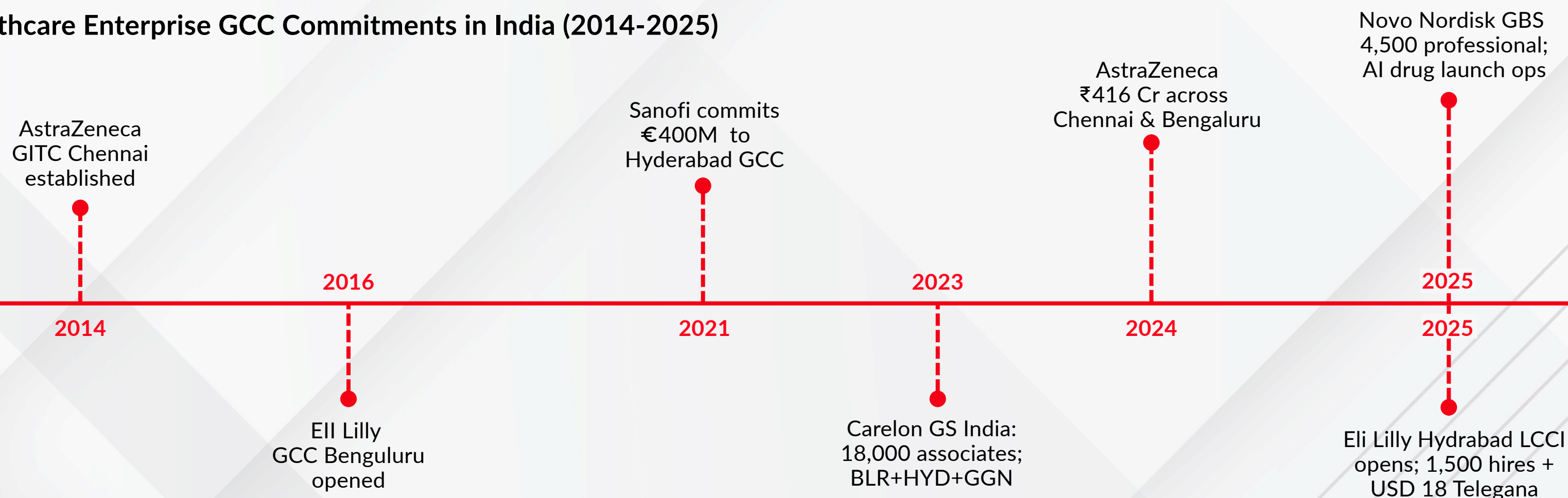


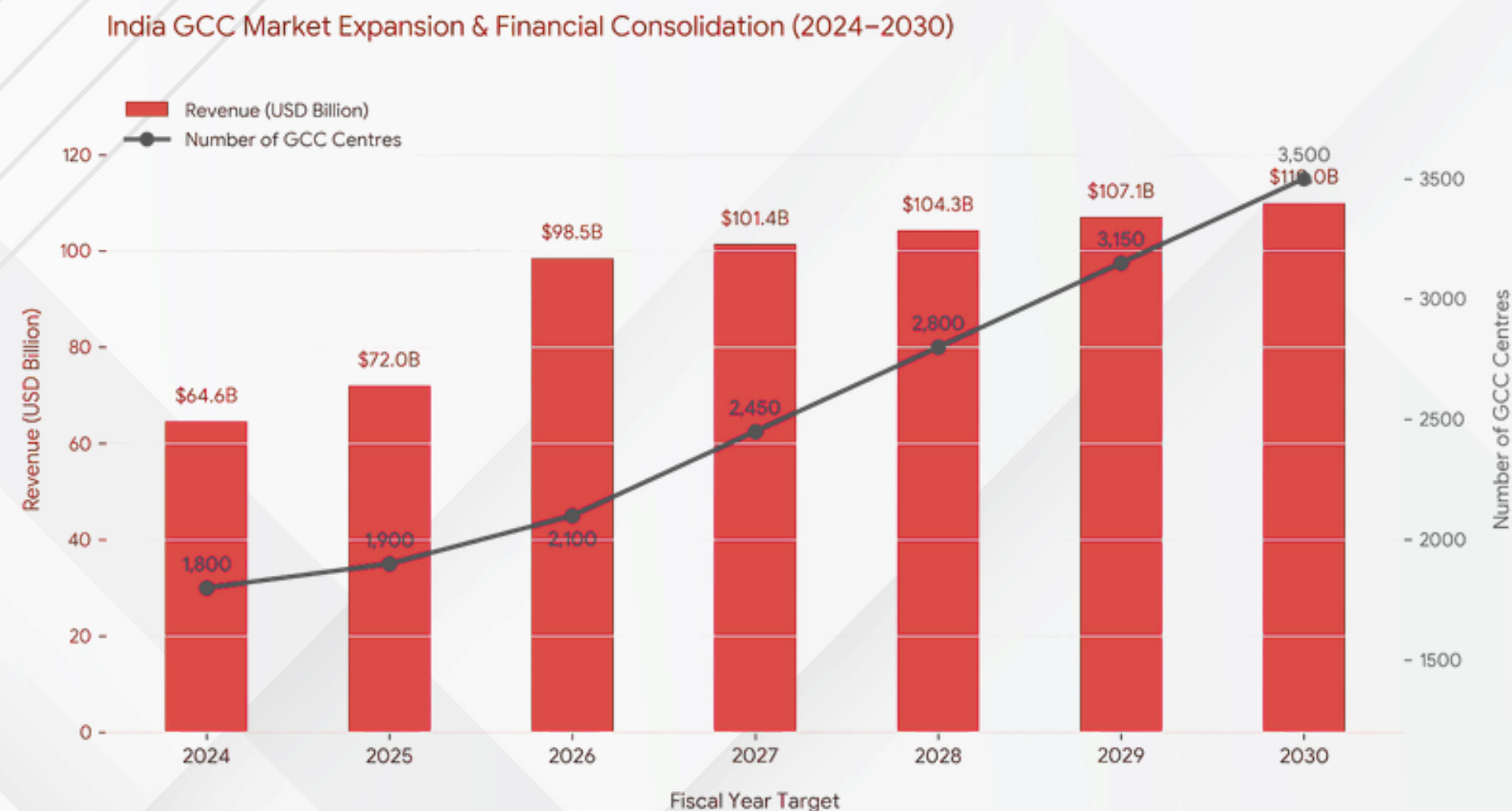
Figure 6.1: Key Healthcare Enterprise GCC Commitments in India (2014–2025) Sources: Company press releases; NewsonAir; FiercePharma; BusinessToday; HRKatha

Forward Projections and GCC Implications

The healthcare and life sciences GCC segment in India is operating across three concurrent growth vectors: **expansion of the center count and workforce, growth in the addressable market for pharma and life sciences capability, and the progressive shift from operational functions toward drug discovery, regulatory science, and clinical data ownership.** The 2026–2030 period compresses these vectors into a single decision window for European pharma enterprises evaluating whether to deepen India operations or hold the current footprint.

GCC Revenue and Center Count: 2026–2030

India's GCC ecosystem has reached unprecedented scale, with 2,100+ active centers generating USD 98.5 billion in annual revenue and employing 2.4 million professionals as of FY2026. Supported by the world's largest concentrated pool of advanced technology talent, including over 250,000 AI and machine learning specialists, the sector has evolved beyond traditional shared services.



Today, 46% of GCCs function as portfolio or transformation hubs, reflecting India's growing role as a strategic center for global innovation, R&D, digital operations, and enterprise transformation.

Far beyond a cost-optimization model, India now serves as a strategic hub for global healthcare enterprises, owning critical functions across drug discovery, pharmacovigilance, regulatory affairs, and clinical development.

Access to one of the world's largest pools of AI, life sciences, and STEM talent enables accelerated adoption of advanced analytics, computational biology, and AI-driven R&D. Supported by mature healthcare innovation clusters such as Bengaluru and Hyderabad, India offers an unparalleled ecosystem for **intellectual property creation, end-to-end lifecycle management, and enterprise-wide transformation, positioning GCCs as engines of global innovation rather than merely execution centers.**

Risk Factors: Regulatory, Geopolitical, and Talent Constraints

Despite India's emergence as a leading destination for healthcare and life sciences GCCs, sustained growth through 2030 will depend on the industry's ability to navigate a set of evolving regulatory, talent, and geopolitical considerations. These challenges are largely operational rather than structural and are increasingly being addressed through policy reforms, ecosystem investments, and enterprise-led capability development.

Regulatory and Data Governance Considerations

- India has undertaken significant modernization of its healthcare regulatory framework through **digitization initiatives, harmonization efforts with global standards, and implementation of the Digital Personal Data Protection (DPDP) Act.**
- However, multinational healthcare organizations must continue to manage differences in **regulatory submission requirements, pharmacovigilance processes, data localization expectations, and evolving privacy regulations across jurisdictions.**
- For organizations operating **global clinical, patient, and real-world evidence platforms, cross-border data governance and compliance** remain key areas requiring efficient oversight and legal alignment.

Talent Availability and Capability Depth

- India's annual output of more than **two million STEM graduates** provides one of the world's deepest healthcare and technology talent pools.
- However, demand for highly specialized expertise, including **pharmacovigilance leadership, biostatistics, clinical data science, regulatory intelligence, translational medicine, computational biology, and AI-enabled drug discovery, continues to outpace supply in certain segments.**
- Competition for experienced professionals, particularly those with global regulatory and therapeutic-domain expertise, remains intense.
- Additionally, multilingual capabilities required for global case processing and region-specific regulatory operations can create targeted recruitment challenges for multinational organizations.



Geopolitical, IP, and Operating Model Considerations

- India maintains a mature intellectual property regime aligned with **WTO-TRIPS obligations** and continues to **strengthen its innovation ecosystem** through **biotechnology, digital health, and advanced manufacturing initiatives**.
- Nevertheless, multinational pharmaceutical and medical technology companies must evaluate **patent protection frameworks, evolving trade relationships, and jurisdiction-specific IP considerations** as part of broader risk management strategies.
- In parallel, global healthcare organizations increasingly favor multi-hub operating models that distribute critical R&D, clinical development, data management, and supply chain functions across multiple geographies, enhancing resilience against geopolitical, regulatory, and operational disruptions.

While these factors require strategic planning and governance, they do not diminish India's long-term attractiveness as a healthcare GCC destination. Rather, they represent the next stage of ecosystem maturation as India transitions from a large-scale execution center to a globally integrated hub for innovation, research, regulatory excellence, and digital healthcare transformation.



Conclusion

The strategic case for India as the global hub for life sciences and healthcare GCCs is no longer emerging; it is established. Supported by deep scientific talent, world-class digital capabilities, a rapidly expanding bioeconomy, and an increasingly integrated **EU-India economic framework**, India has evolved from an operational support destination into a critical engine of global pharmaceutical innovation, regulatory excellence, and R&D execution.

For European healthcare enterprises, India offers a combination of scale, specialized expertise, and transformation capability that remains unmatched by alternative geographies. For India, deeper integration with European pharmaceutical and healthcare value chains represents a pathway to higher-value innovation, advanced manufacturing, and global leadership in life sciences.

The next phase of growth will be defined by the depth of capability ownership rather than the number of GCCs established. As healthcare organizations increasingly adopt AI-native R&D models, precision medicine, digital therapeutics, and data-driven clinical operations, **India is uniquely positioned to become the global command center for these high-value functions**. The convergence of advanced scientific talent, AI expertise, regulatory capabilities, and a supportive innovation ecosystem creates a structural advantage that extends beyond cost efficiency, enabling enterprises to accelerate discovery, improve productivity, and drive long-term value creation at a global scale.

The opportunity ahead is no longer defined by policy ambition but by execution. **Organizations that position themselves early within this evolving ecosystem will be best placed to capture the next decade of growth, innovation, and competitive advantage in global healthcare.**



Abbreviations

Abbreviation	Full Form
ADMET	Absorption, Distribution, Metabolism, Excretion and Toxicity
AI	Artificial Intelligence
AIIMS	All India Institute of Medical Sciences
ANDA	Abbreviated New Drug Application
API	Active Pharmaceutical Ingredient
BLA	Biologics License Application
BMS	Bristol Myers Squibb
BPM	Business Process Management
CAPEX	Capital Expenditure
CAGR	Compound Annual Growth Rate
CDISC	Clinical Data Interchange Standards Consortium
CDM	Clinical Data Management
CDSCO	Central Drugs Standard Control Organization
CDSS	Clinical Decision Support System
CFR	Code of Federal Regulations
CMC	Chemistry, Manufacturing and Controls
CoE	Centre of Excellence
CRF	Case Report Form
CRO	Contract Research Organization
CSR	Clinical Study Report

CTA	Clinical Trial Application
CTD	Common Technical Document
CTRI	Clinical Trials Registry – India
DCT	Decentralized Clinical Trial
DL	Deep Learning
DPDP Act	Digital Personal Data Protection Act
eCRF	Electronic Case Report Form
EHR	Electronic Health Record
EMA	European Medicines Agency
EPAR	European Public Assessment Report
eCTD	Electronic Common Technical Document
EU	European Union
FAERS	FDA Adverse Event Reporting System
FDA	U.S. Food and Drug Administration
FHIR	Fast Healthcare Interoperability Resources
GCC	Global Capability Center
GBS	Global Business Services
GCDMP	Good Clinical Data Management Practices
GenAI	Generative Artificial Intelligence
GIC	Global Innovation Center
GLP	Good Laboratory Practice

GLP-1	Glucagon-Like Peptide-1
GPU	Graphics Processing Unit
GVP	Good Pharmacovigilance Practices
GVO	Global Value Organization
HITEC	Hyderabad Information Technology and Engineering Consultancy City
IB	Investigator’s Brochure
ICH	International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use
ICSR	Individual Case Safety Report
IND	Investigational New Drug
IPC	Indian Pharmacopoeia Commission
IP	Intellectual Property
IoMT	Internet of Medical Things
ISPE	International Society for Pharmacoepidemiology
ISTAND	Innovative Science and Technology Approaches for New Drugs
IT	Information Technology
KPI	Key Performance Indicator
LOE	Loss of Exclusivity
LSHC	Life Sciences and Healthcare
M&A	Mergers and Acquisitions
MAA	Marketing Authorisation Application
MedDRA	Medical Dictionary for Regulatory Activities

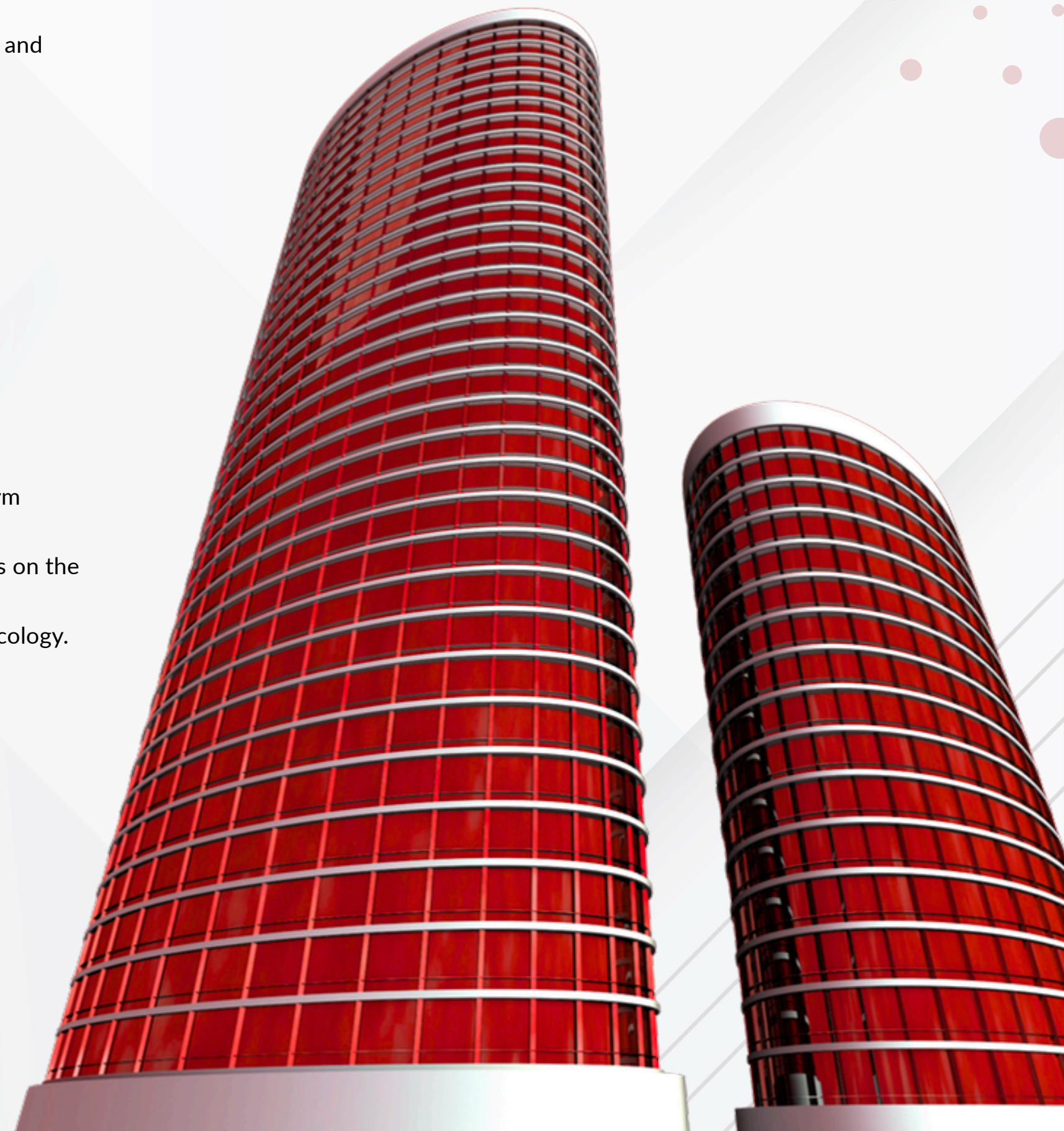
MHRA	Medicines and Healthcare products Regulatory Agency (UK)
ML	Machine Learning
MRP	Mutual Recognition Procedure
NDA	New Drug Application
NeeS	Non-eCTD Electronic Submission
NN	Neural Network
OECD	Organisation for Economic Co-operation and Development
PMDA	Pharmaceuticals and Medical Devices Agency (Japan)
PoC	Proof of Concept
PBRER	Periodic Benefit-Risk Evaluation Report
PIL	Patient Information Leaflet
PRAC	Pharmacovigilance Risk Assessment Committee
PSUR	Periodic Safety Update Report
PV	Pharmacovigilance
PVPI	Pharmacovigilance Programme of India
QRD	Quality Review of Documents
REMS	Risk Evaluation and Mitigation Strategy
R&D	Research and Development
RDI Fund	Research, Development and Innovation Fund
RMP	Risk Management Plan
RWE	Real-World Evidence

SaMD	Software as a Medical Device
SAR	Serious Adverse Reaction
SAS	Statistical Analysis System
SCC	Standard Contractual Clauses
SDTM	Study Data Tabulation Model
SEZ	Special Economic Zone
SG&A	Selling, General and Administrative Expenses
SmPC	Summary of Product Characteristics
STEM	Science, Technology, Engineering and Mathematics
TTC	Trade and Technology Council
UAT	User Acceptance Testing
UMC	Uppsala Monitoring Centre
US	United States
USD	United States Dollar
VigiBase	WHO Global Individual Case Safety Report Database
WHO	World Health Organization
WTO	World Trade Organization



References

- Ministry of Science & Technology, Government of India. BioE3 Policy (Biotechnology for Economy, Environment, and Employment), 2024.
- Ministry of Electronics & Information Technology (MeitY). IndiaAI Mission Cabinet Approval, 2024.
- Central Drugs Standard Control Organization (CDSCO). Clinical Trial Waiver Notification, August 2024.
- Indian Pharmacopoeia Commission (IPC). Pharmacovigilance Programme of India (PVPI).
- World Health Organization (WHO). Prequalification Programme and VigiBase Safety Monitoring Framework.
- NASSCOM. Life Sciences GCC Report, 2024.
- Deloitte. Measuring the Return from Pharmaceutical Innovation, 2024 and 2025 Editions.
- ResearchAndMarkets. Global Biosimilars and Pharmaceutical Market Reports, 2025–2026.
- Precedence Research. Global Biosimilars Market Forecast, 2025.
- International Council for Harmonization (ICH). E6(R3) Good Clinical Practice Guideline, 2025.
- International Council for Harmonization (ICH). M3(R2), M4 CTD, E2B(R3), E2C(R2), and E9(R1) guidelines.
- U.S. Food and Drug Administration (FDA). Real-World Evidence Framework.
- European Medicines Agency (EMA). Real-World Evidence Methodology Guidelines and EU Pharmaceutical Reform Package.
- Abdelrahman, R.M. (2026). Harnessing GLP-1 Receptor Agonists for Obesity Treatment: Prospects and Obstacles on the Horizon. Journal of Functional Foods.
- Madar, I.H. (2026). Past, Present, and Future of Nivolumab: New Horizons in Immuno-Oncology. Frontiers in Oncology.
- Rizwan, A. (2026). Biosimilars: Bridging the Gap in Biologics, Access, and Affordability. BioTech Industry.
- AstraZeneca, Novartis, Sanofi, Bristol Myers Squibb, Pfizer, Johnson & Johnson, Eli Lilly, Novo Nordisk, and GSK corporate announcements, annual reports, investor presentations, and press releases (2024–2026).
- IBEF (India Brand Equity Foundation). Biotechnology and Biosimilars Industry Reports, 2024–2025.
- DrugPatentWatch. Patent Expiry and Loss of Exclusivity Database, 2025.
- PharmExec. Global Pharmaceutical Workforce and Talent Studies, 2025.
- European Commission. Health Workforce and Skills Gap Reports, 2024–2025.
- BioE3 Policy, Ministry of Science & Technology (Aug 2024);
- IndiaAI Mission, MeitY (March 2024 Cabinet approval);
- DBT-BIRAC NBM-i3; Invest India Biotech Sector page;
- PIB Press Release PRID 2115882.



Inductus **GCC** Service Models

— India's Leading GCC Enabler —

BOT (Build-Operate-Transfer)

A structured pathway to establishing your GCC with minimized risk and maximum efficiency. We **build** and **operationalize** your center, ensuring seamless performance before **transferring full ownership** to you—**equipping your business with a mature, self-sustaining capability**.

COPO (Company-Owned, Partner-Operated)

Maintain **full ownership** while leveraging Inductus' operational expertise. This model enables you to establish a GCC with **absolute control over intellectual assets (IP), agility, and scalability** while we manage day-to-day operations, **ensuring zero liability, compliance, and maximum efficiency**.

Additionally, a **Zero Capex Model** with **Digital Twin** or a **Mirror Like Operational Structure** with superior process excellence.

FLEXI (Adaptive & Custom GCC Solutions)

Beyond predefined structures, **Flexi** is a **bespoke model offering absolute customization and adaptability**.

It molds itself around your unique business prerequisites, evolving seamlessly with your vision. **This isn't just a service—it's an agile, high-impact partnership crafted to maximize your success.**

Proud recipient of **Times Power Icons Award**
for being one of the **Leading GCC Enabler of India**

Presented by



Inductus ensures that each model is executed with precision, innovation, and strategic foresight—helping you unlock the full potential of your GCC in India.

Our deep expertise in GCCs, coupled with a strong network of industry partnerships and policy-level advisory, positions us as a trusted partner for driving transformational outcomes.

Certificate of Excellence for Consulting & Advisory Services
by **Chicago Open University USA**



COPO & Digital Twin Integrated Service Model

A study based proposition to build a global standard GCC mechanism for Large & Mid-sized Corporations



“

"In a world full of rapid tech & process disruptions, global corporations that invest in innovation-led R&D don't just survive—they lead. Innovation is the key to staying relevant, cost-competitive, and future-ready in an ever-evolving marketplace..."

— Alouk Kumar - CEO, Inductus —

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Inductus GCC's Digital Twin and COPO (Company-Owned, Partner-Operated) Service Model creates a seamless, future-ready operational framework for global businesses setting up GCCs in India. The Digital Twin Process ensures real-time collaboration, decision-making, and operational efficiency by replicating physical systems in a virtual environment, enabling synchronized execution across multiple time zones. Meanwhile, the COPO Model allows MNCs to retain full ownership and strategic control while leveraging Inductus' expertise for execution, compliance, and scalability.

This hybrid approach optimizes costs, mitigates risks, and accelerates GCC growth, ensuring innovation-driven operations with minimal liabilities and maximum efficiency.



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